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THE FORTIETH
ANNUAL MEDICAL REPORT

OF THE

Trudeau Sanatorium

AND THE

TWENTIETH MEDICAL SUPPLEMENT

FOR THE YEAR ENDING OCTOBER 31, 1924

TOGETHER WITH THE

EIGHTH COLLECTION OF THE STUDIES OF THE
Edward L. Trudeau Foundation

FOR RESEARCH AND TEACHING IN TUBERCULOSIS

NOTICE

The custom of combining the Annual Medical Report of the Trudeau Sanatorium, the Pathologist's report from the Saranac Laboratory, and the reprinted Studies of the Trudeau Foundation, is continued as in the past. The published Studies, comprising the eighth number, include both clinical and laboratory work done by the regular Staff and by Fellows occupied with investigations while regaining their health.

Copies of the 1920, 1921, 1922, and 1923 Studies will be furnished postpaid at fifty cents each. Sanatoria, libraries and laboratory exchanges free.

EDWARD R. BALDWIN, M.D.,
Director.

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ANNUAL REPORT OF THE TRUDEAU SANATORIUM MEDICAL BOARD

1924

Lawrason Brown, M.D., Chairman

As usual the main effort of the entire medical staff, whether working as clinicians, or in the research or *x*-ray laboratories, has been to turn every new advance to the benefit of the patients in their immediate care. We can no longer doubt the advance in medicine and in the care and treatment of the tuberculous patient if we but cast our eyes backward twenty-five years. At that time there were only three or four sanatoriums in the whole country and all had but meagre incomes. Today there are hundreds and many with ample funds behind them. We have had to keep up as best we could in the face of our constant deficit and it is not surprising that we have only now, with the opening of the new Ludington Memorial Infirmary, joined the ranks of the Class A institutions. The only thing that has kept us among the leaders is the wonderful spirit, handed down from Dr. Trudeau, that inspires and stimulates the workers at Trudeau. What we have accomplished in the past has been due to this enthusiasm rather than to physical opportunities. The ideal held up to the workers at Trudeau has always been service to his fellow man, whether performed in the laboratory or by the bedside. Curious as it may seem, the laboratory workers often perform greater service to humanity than the clinicians, especially when the latters' efforts are expended only in applying to the individual patient the modern advances of medical science. It has seemed to me that the time will soon come when it may be wise to group all of our activities under a Trudeau Tuberculosis Institute.

The new Ludington Memorial Infirmary will enable us to care for our patients in a way hitherto impossible. Many needed rest and we could not give it to them. Now all who require it can have it as long as necessary. This lack of opportunity for rest has for years been a source of severe and just criticism of many sanatoriums.

The medical staff feels keenly that, as suggested by Dr. Baldwin, the endowment should be so increased that we could again offer infirmary treatment to those who need it at an additional weekly cost of only $5.00.

The Laboratory

The new quarters with its increased facilities for work have greatly stimulated Dr. Petroff and his associates in the laboratory. The heavy routine work has been carried out as usual and includes numerous sputum and urine examinations and complement-fixation tests for tuberculosis and syphilis on each patient, and blood, blood chemistry, stool examinations and basal metabolism determinations on numerous patients who require them.

At all times efforts are being made to improve the routine examination and among others, new methods for finding tubercle bacilli in secretions have been studied, but so far the old Ziehl-Nielsen method holds its own. Routine examination by newer methods shows how rarely elastic tissue occurs in the sputum of the modern sanatorium patient.

The pathology and treatment of intestinal tuberculosis could be greatly aided if experimental intestinal tuberculosis could be produced in laboratory animals. For the past year many methods have been used but so far only occasionally has ulcerative intestinal tuberculosis been produced. The problem is still being studied. Work on the chemistry of stools of intestinal tuberculosis is under way to see if there are any departures from the stools of patients without intestinal tuberculosis.

The study of skin hypersensitiveness, begun four years ago by Dr. Petroff while working with Professor Zinsser, has been steadily pursued. During the past year Dr. Frederick Stewart has been associated with Dr. Petroff in carrying on pathological studies on animals sensitized with dead tubercle bacilli. They have been able to reproduce by this method every type of reaction, skin, pleural, testicular, produced in animals by the injection of living tubercle bacilli, either virulent or avirulent. The conclusions reached so far are that dead tubercle bacilli can produce skin hypersensitiveness in normal animals; that such hypersensitiveness can last for five hundred days and is consequently not transitory; that an animal so sensitized possesses some degree of immunity. This work has been confirmed in large part by Zinsser at Harvard, and Crawford at the Bureau of Animal Industry in Washington.

Work in the classification of human tubercle bacilli has been continued under Mr. Wendell James. Over one hundred preparations for culture media have been used. The work is necessarily laborious and long drawn out. Mr. James has been working with proteins derived from other sources than tubercle bacilli in an attempt to produce skin hypersensitiveness.

The routine work has been ably carried on under Miss Mary Thomas, who has had remarkable success in cultivating tubercle bacilli directly from the sputum by Dr. Petroff's method.

Routine chemical analysis of many secretions and preparations of various solutions used in the treatment of our patients have been carried out by Mr. Frank Cooper. He has also made a study of the acid-fast properties of the tubercle bacillus. This study may have a very practical bearing as it is possible that under certain conditions the acid-fastness of tubercle bacilli may be lost. In such a case a diagnosis of tuberculosis may be long postponed to the great injury of the patient. Further, if dead tubercle bacilli come into use in the protection of children, it will become necessary to find some means to render them less irritating in order to avoid abscess formation.

The chemical study of the stools has been largely worked on by Mr. LaMont West.

The laboratory staff have at present their own cottage and they are very congenial. Weekly conferences stimulate greatly the workers, make for closer coöperation and for further investigation and assist the clinical staff in the treatment of the patients. The Sanatorium owes much to Dr. Petroff and his associates for their excellent work.

The *X*-ray Work

The *x*-ray department under Mr. Sampson becomes more important to our patients at Trudeau each year. Some years ago we made routine stereoscopic plates of every patient admitted to the sanatorium. We then plated them on discharge but now practically every patient has, during his five or six months residence, at least three sets of plates. Besides this, routine examinations of the intestines, to exclude latent intestinal tuberculosis, and of the teeth in connection with the routine dental examination have been added to the work with ridiculously small or, indeed, no increase of charge to the patients. This has been made possible by the moderate prices charged to patients outside the sanatorium; for our laboratory does the work for Saranac Lake Village and the surrounding country.

It is of interest to note the volume of work. Approximately 20,000 films were used during the year in the examination of 6225 patients and many fluoroscopic examinations made as well. The intestinal examinations average eighty per month and the amount of work involved in this is difficult to conceive unless witnessed.

Mr. Sampson and his assistants have not been satisfied to do only the routine, which is so important, but have pursued studies along many lines and demonstrated the work of the laboratory to a large number of physicians who nearly every month visit the sanatorium. Beside this, regular instruction has been given during the session of the Trudeau School for Tuberculosis, the assistant resident physicians have received a course in the interpretation and technic of *x*-ray films, and a course in technic has been given to a class of nurses.

For some years Mr. Sampson has been working on the standardization of technic for *x*-ray laboratories, especially in connection with chest work. The result of seven years' work has been arranged and studied and will shortly be published. A comparison of the work of other laboratories with Mr. Sampson's shows that none is better and few equal his routine work. It is interesting to note that with the careful use of the Potter-Bucky diaphragm many cases of spinal disease have been diagnosed which formerly might have been passed by. Intensive studies of the classification of pulmonary tuberculosis and its mode of progress have been made. Much time has been devoted to the preparation of a monograph on the diagnosis and treatment of intestinal tuberculosis which will be published as the first volume of the series of the Trudeau Foundation publications.

The *x*-rays have come more and more into use in treatment of many complications and of various diseases. The room set apart for this work has been in constant use.

Constant thought is given to improvement of routine technic and the addition of new prisms to the revolving stereoscope will greatly increase the efficiency of an apparatus devised by Mr. Sampson which has been widely copied over the whole country.

THE CLINICAL DEPARTMENT

The routine medical work has been faithfully and skillfully performed by the resident staff. Today we feel that few cases pass through our hands without careful study in regard to diagnosis and to treatment. The Monday morning staff meetings devoted to diagnosis are always interesting and full of discussion. A conference is held, usually weekly, at which all cases are discussed that have not done well, after a residence in the institution of two months. This has proved of great help. The lectures delivered to the nurses by the members of the staff, including Dr. Trudeau, Dr. Hayes, Dr. Gardner and Dr. Welles, are excellent, fully as good or better than those given in many of the larger nursing schools. We owe a debt of gratitude for this service. Dr. Hahn has made a careful study of the occurrence of pitting of the finger-nails and is now at work on blood sedimentation.

It is of interest to note that of the 268 patients discharged during the year, 34 (12.6 per cent) were in a far advanced stage, closely corresponding with the figures of last year. The explanation of this may be that the newer methods of classification are stricter or that we are getting more advanced cases. We have been expecting to face the latter problem and hence the keen satisfaction of the staff at the completion of the Ludington Memorial Infirmary where sooner or later most of these patients will drift. It is of interest to note that while we accept patients from any state or country, 53 per cent come from New York State. Of the 268 patients 36 were veterans of the World War.

TRUDEAU SCHOOL OF TUBERCULOSIS

The tenth session of the school, held in May and June, was apparently successful. The new lecture room (our old laboratory), greatly increased the comfort of the students and teachers. The enlarged facilities in the laboratory and the *x*-ray department have greatly simplified the teaching and enabled us often to present the various subjects in a new and better way. We depart each year more and more from set clinical lectures and attempt to make all the work intensely practical. Conferences have almost entirely replaced lectures.

THE D. OGDEN MILLS TRAINING SCHOOL FOR NURSES

It should be recalled that last year our Superintendent of Nurses, Miss K. G. Amberson, suggested certain changes which she thought desirable if we were to continue the training school. These have all been carried out during the past year. We have now a larger graduate staff including a Superintendent of Nurses, an Assistant Superintendent and Instructor, a Night Supervisor, a Head Nurse at the Childs Memorial, all of whom are registered in New York State, and two of our own graduates, head nurses at the Kerbs Cottages and at the Reception and Medical Pavilion. This increase in the nursing staff has greatly increased the efficiency of the school as well as the cost of maintaining it. With this staff we can meet all the requirements of the Regents of the State of New York.

The eight-hour day has been maintained for the staff and pupils. This period includes class-work and, at times, owing to the lack of sufficient numbers of students, due in part to illness, affiliation, absence and resignations, it has been difficult to carry out.

The records of the school were in need of revision and Miss Amberson adopted the Bell system, modified to meet our needs, which was suggested by the State Supervisor of Nursing.

Affiliation with a general hospital for medicine, surgery and pediatrics has claimed much attention. After a visit to New Haven by Miss Amberson, we have been fortunate in obtaining an affiliation with the Yale School of Nursing, an ideal place for our nurses, as they have a forty-four hour week, exclusive of class-work, and the living conditions are good. Particular attention is given to those nursing procedures which cannot be given in a specialized school such as ours. Our affiliation with the Manhattan Maternity Hospital has proved very satisfactory.

The most urgent need at present is an addition to the Nurses' Home. We have at present 2 nurses in each room, originally built to accommodate 1, but made possible on account of the large sleeping porches. The only room available for callers or for study is the main living room. As 6 nurses are now living elsewhere, and as more nurses will be needed when the Ludington Memorial Infirmary is opened, the urgent need for the addition is clearly obvious.

We have been unable to supply the demand for graduates of our school to fill positions in sanatoriums, and to do special nursing of patients with tuberculosis. The need for a special degree for nurses who can pass the state nursing board examinations, and who for one reason or another cannot affiliate with a general hospital, is more and more emphasized every day. It requires most graduate and registered nurses at least a year to become proficient in the care of patients with pulmonary tuberculosis—unless they, too, are tuberculous. The number of applicants for the training school depends of course upon whether or not such a degree can be obtained. The high class of young women in our school would never consider such a title as trained attendant.

The number of graduates this year was 3; in 1925, 10 will be graduated. We have at present 22 nurses in training.

THE STATISTICAL DEPARTMENT

This department really acts as the liason between the former patients and the Sanatorium. From year to year a brief statement of what has happened at Trudeau is inclosed with these report blanks, and many welcome it. Mr. Hennigar has worked faithfully with little assistance during much of the year. It seems wise to the medical staff to continue this work, which has been indorsed by the American Sanatorium Association.

THE MEDICAL LIBRARY

The medical library has been in constant use throughout the year. We now have forty journals on file, of which eight are gifts. During the year 605 books have been added to the library, of which only 44 were purchased. Beside the general medical library, smaller and more technical libraries exist in the Research and Roentgen Laboratories, where 11 and 6 other special journals are taken. Health bulletins to the number of 12 are donated. Our constant aim is to add only books of value to those working in tuberculosis.

Miss Ross has continued to make herself indispensable to all the workers. Her assistance in looking up references, in procuring books from other libraries (especially the State Library in Albany, the N. Y. Academy of Medicine, the Surgeon Generals Library, to which we express our thanks), and in many other ways has proved most valuable.

The Journal and Review Club meets every two weeks in the library and has proved very stimulating to all those who attend.

THE WORKSHOP

The Workshop, now called the Herbert Scholfield Memorial Workshop, continues its usefulness. We regret to report the resignation of Miss Lucas to accept a position with the Veterans Bureau at Johnson City, Tenn., at an increased salary. This is the usual story at Trudeau. We develop good workers but owing to the lack of funds we are unable to give them what apparently others are able to do. It seems advisable now to attempt to get a well-trained teacher and craftsman who can ably carry on the work so well developed by Mr. Scholfield and Miss Lucas. The Workshop today is an integral part of the treatment at Trudeau.

MEDICAL CLINICS

Again Dr. Heise and Mr. Sampson held a diagnostic clinic at Malone.

MEDICAL LECTURES

Such lectures as usual were given by different members of the staff in many parts of the country. The "diagnostic clinics," originated in this institution, have become popular and similar ones are now held in many sanatoriums throughout the country. Every Wednesday, for fifteen minutes before lunch, some member of the medical staff meets those patients who desire to come into the dining room and answers questions which have previously been placed in a box.

TRUDEAU FOUNDATION PUBLICATIONS

For some years different members of the staff have been approached by several publishers to put into print the results of their work. After some thought and consultation with Dr. James, arrangements have been made with Lea & Febiger to publish, without cost to the Sanatorium, a series of monographs in a distinctive binding, setting forth the work accomplished at Trudeau, to be known as the Trudeau Foundation Publications. The first, which we hope will soon be ready for the printer, will deal with intestinal tuberculosis; then will follow volumes devoted to diagnosis, to treatment and prognosis, and to other subjects.

THE MEDICAL STAFF

As usual during the year the staff has undergone several changes. While it is highly advisable to train as many men as possible for the many positions seeking them, the time is now approaching when it will be advisable to consider whether it is not better to have two permanent resident physicians at the Sanatorium. Dr. Henry W. Leetch resigned during the year to take up practice in Saranac Lake, and Dr. Daniel W. Wheeler resigned to follow tuberculosis work in Minnesota. Dr. Albert G. Hahn was appointed First Assistant, and Dr. David A. Cooper, Second Assistant Resident Physician. Dr. R. C. Walker received a fellowship in medicine for the summer and Dr. A. B. Coulter one for six months.

During the past year the weekly conferences between the executive and medical staffs have helped each to see the problems that confront the other. The medical staff has been spared much thought over many details, and our gratitude is hereby expressed to Dr. Baldwin and Mr. Armstrong for all their help. In Dr. Heise, Dr. Petroff and Mr. Sampson, the Sanatorium possesses a band of workers that could not be replaced, as nowhere in America do I know of a group that is as keenly interested in the practical care of patients, in the scientific study of their work, and in the results that they accomplish. Dr. Trudeau has further continued his study of prognosis. We are indebted to Dr. Daniel W. Wheeler, to Dr. Albert G. Hahn, and to Dr. David A. Cooper for their excellent care of the patients and for their assistance during the session of the Trudeau School; to Miss Amberson and to Miss Sawtell for their efficient work in the nursing of the patients; to Mr. Pomeroy, the pharmacist; to Dr. Wm. M. Gardner, the dentist and to the other members of the various staffs for their good and helpful work.

FORTIETH MEDICAL REPORT AND TWENTIETH MEDICAL SUPPLEMENT

FRED H. HEISE, M.D., Resident Physician

In order that the medical supplement may be better understood, the criteria used by us in diagnosis and the classification adopted by the American Sanatorium Association, by which all cases were classified, and our detailed *x*-ray classification, are given below. With a knowledge of these it is hoped that the reader may get as accurate a conception of each patient as is possible without a detailed account.

Trudeau Sanatorium Diagnostic Criteria (Pulmonary only).

Non-tuberculous:

1. No persistent rales in the upper one-half of the chest.
2. *X*-ray negative or showing a slight peritruncal lesion.
3. Tubercle bacilli never found in sputum.
4. Complement-fixation test for tuberculosis positive or negative.
5. No constitutional or focal reaction to the subcutaneous tuberculin test after the injection of 10 milligrams of O. T. once repeated. (Scale of doses: 0.0001, 0.001, 0.003, 0.005, 0.01, 0.01.)
6. Constitutional reaction to the subcutaneous tuberculin test of 10 milligrams (repeated once) or less without focal reaction as determined by physical signs (rales) or *x*-ray.
7. No history of unexplained hemoptysis of a teaspoonful or more.
8. No history of unexplained pleurisy with effusion.

Suspected Tuberculosis:

1. No persistent rales in the upper one-half of the chest.
2. *X*-ray negative or showing a slight peritruncal lesion.
3. Tubercle bacilli never found in sputum.
4. Complement-fixation test for tuberculosis positive or negative.
6. The patient may react to the subcutaneous tuberculin test with evidence of focal reaction by physical signs (rales) but not by *x*-ray.
7. A history of unexplained hemoptysis of a teaspoonful or more, or,
8. A history of unexplained pleurisy with effusion, but not both (7, 8).

Tuberculosis (Pulmonary):

Non-clinical:

1. No persistent rales in the upper one-half of the chest.
2. A parenchymatous *x*-ray lesion not explainable by other causes.
3. Tubercle bacilli never found in the sputum.
4. Complement-fixation test for tuberculosis positive or negative.
5, 6. The patient may or may not react to the subcutaneous tuberculin test after injection of 10 milligrams (once repeated) of O. T. All evidence of focal reaction by physical signs (rales) or *x*-ray must be absent.
7. No history of unexplained hemoptysis of a teaspoonful or more.
8. No history of unexplained pleurisy with effusion.
9. Symptoms must be absent.

Clinical Tuberculosis: Any one or more of the following:

1. Persistent rales in the upper one-half of the chest.
2. Parenchymatous *x*-ray lesion.

3. Tubercle bacilli in the sputum.
7, 8. An unexplained history of hemoptysis of a teaspoonful or more, together with an unexplained history of pleurisy with effusion.
5. Focal reaction as determined by x-ray after the subcutaneous tuberculin test of 10 milligrams (once repeated) of O. T. or less. Symptoms must have been present at some time.

AMERICAN SANATORIUM ASSOCIATION SCHEMA FOR THE CLASSIFICATION OF PATIENTS ON ADMISSION

LESION	SYMPTOMS
Minimal: (Incipient): Slight lesion limited to a small part of one or both lungs. No serious tuberculous complications.	A: (Slight or none): Slight or no constitutional symptoms, including particularly gastric or intestinal disturbance or rapid loss of weight; slight or no elevation of temperature or acceleration of pulse at any time during the twenty-four hours. Expectoration usually small in amount or absent. Tubercle bacilli may be present or absent.
Moderately advanced: A lesion of one or both lungs, more widely distributed than under Minimal, the extent of which may vary, according to the severity of the disease, from the equivalent of one-third the volume of one lung to the equivalent of the volume of an entire lung with little or no evidence of cavity formation. No serious tuberculous complications.	B: (Moderate): No marked impairment of function, either local or constitutional.
Far Advanced: A lesion more extensive than under Moderately Advanced. Or definite evidence of marked cavity formation. Or serious tuberculous complications.	C: (Severe): Marked impairment of function, local or constitutional.

SCHEMA FOR THE CLASSIFICATION OF SUBSEQUENT OBSERVATIONS

Apparently cured: All constitutional symptoms and expectoration with bacilli absent for a period of two years under ordinary conditions of life.

Arrested: All constitutional symptoms and expectoration with bacilli absent for a period of six months; the physical signs to be those of a healed lesion; roentgen findings to be compatible with the physical signs.

Apparently arrested: All constitutional symptoms and expectoration with bacilli absent for a period of three months; the physical signs to be those of a healed lesion; roentgen findings to be compatible with the physical signs.

Quiescent: Absence of all constitutional symptoms; expectoration and bacilli may or may not be present; physical signs and roentgen findings to be those of a stationary or retrogressive lesion; the foregoing conditions to have existed for at least two months.

Improved: Constitutional symptoms lessened or entirely absent; cough and expectoration with bacilli usually present; physical signs and roentgen findings to be those of a stationary or retrogressive lesion.

Unimproved: Essential symptoms unabated or increased; physical signs and roentgen findings to be those of an active or progressive lesion.

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SPECIAL PROVISIONS AND DEFINITION OF TERMS

It is expected that all sanatoria or others using this classification will specify in their reports whether or not roentgen-ray pictures have been used.

Physical signs and roentgen findings are often at variance, and a given lesion should be classified by the method revealing the greater extent or intensity. For the convenience of those who want to specify in each case the basis of classification, the following optional schema of symbols is provided: When roentgen findings or physical signs are the basis of the classification, the letter (R) or the letter (P) may be written, respectively, after the group title, as Moderately Advanced (R) or Moderately Advanced (P). When the two examinations agree the symbol (PR) may be used. If a case is classified Far Advanced solely because of the presence of a serious tuberculous complication the symbol (Comp.) may be affixed.

It should be made clear that roentgen findings may be positive where physical signs are negative or doubtful or, less frequently, that definite tuberculosis may exist without demonstrable roentgenographic change.

Pneumothorax, spontaneous or induced, is to be regarded as a serious complication and its presence places the case in the Far Advanced group. If, at the time of discharge, pneumothorax exists, the patient's condition is not to be considered as better than Improved.

This classification provides for the following groups and subgroups:

Minimal A	Moderately Advanced A	Far Advanced A
Minimal B	Moderately Advanced B	Far Advanced B
Minimal C	Moderately Advanced C	Far Advanced C

The following definitions of roentgen findings are based on the study of stereoscopic negatives (plates or films). Fluoroscopy may be of help, but alone is of less value.

UNDER MINIMAL

1. *Slight Lesion:*

(*a*) Physical Signs: Possibly slight depression above or below the clavicle, lessened movement of the chest, narrowing of the isthmus of apical resonance or restricted diaphragmatic excursion; slight or no impairment of resonance; slight or no change in quality or intensity of breath sounds, with or without some change in the rhythm (that is, prolonged expiration); vocal resonance possibly slightly increased; rales present, absent or transitory. If sputum contains tubercle bacilli, any of these.

(*b*) Roentgen Findings: Roentgenograms to show lessened transmission of light in the form of poorly defined, light mottling or diffuse haziness interpreted as infiltration or conglomeration of tubercle, or more intense shadows of a well-defined, stellate or fibrillar character interpreted as fibrosis, with or without opacities interpreted as calcification.

2. *A Small Part of One or Both Lungs:* Total volume of involvement, regardless of distribution, shall not exceed the equivalent of the volume of lung tissue which lies above the second chondrosternal junction and the spine of the fourth or body of the fifth thoracic vertebra on one side.

UNDER MODERATELY ADVANCED AND FAR ADVANCED

3. *Lesion Allowable under Moderately Advanced:* One or both lungs may be involved but the total involvement shall not exceed the following limits:

(*a*) Slight disseminated infiltration or fibrosis which may extend through not more than the equivalent of the volume of one lung.

(*b*) Severe infiltration with or without fibrosis, which may extend through not more than the equivalent of one-third the volume of one lung.

(*c*) Any gradation within the above limits.

(*d*) Total diameter of cavities, if present, should not exceed 2 cm.

4. *Physical Signs of Moderately Advanced Lesions* are more variable than those of Minimal lesions and do not usually determine the exact extent of the involvement.

5. *Roentgen Findings in Moderately Advanced Lesions:* Roentgenograms to show shadows similar in character to those described under Minimal (paragraph 1, b), but more extensive or more intense, with or without areas of rarefaction interpreted as cavity formation.

6. *Definite Evidence of Cavity Formation:* Tubercle bacilli usually present; elastic fibers may be present in sputum. Physical signs may not be definite, but a combination of any four of the following signs is to be taken as indicative of cavity formation: (1) Bubbling or consonating rales; (2) cracked-pot note; (3) amphoric breathing; (4) intense whispering pectoriloquy; (5) post-tussive suction. Roentgenograms to show single or multiple areas of rarefaction surrounded by dense borders.

7. *Serious Complications:* These should be limited to tuberculous complications affecting any organ or tissue to such an extent as to impair seriously local function, as determined by symptoms, and influence unfavorably the prognosis of the case.

Under Symptoms

8. *Slight Constitutional Symptoms:* Slight impairment of digestion; slight loss of appetite, of strength, of weight; lassitude; nervousness; possibly slight acceleration of pulse or possibly slight elevation of temperature. (See definitions No. 9 and No. 10.) The impairment of health may be hardly apparent, objectively or subjectively.

9. *Slight Elevation of Temperature:* Maximum temperature after rest for one-half hour, seldom over 99.5° F. by mouth or 100.5° F. by rectum.

10. *Slight Acceleration of Pulse:* Maximum pulse rate seldom over 90 per minute for men and 96 per minute for women, after resting for one-half hour, sitting or lying, except when due to causes other than tuberculosis.

11. *Absence of Tubercle Bacilli:* Each monthly examination, if the sputum has previously been negative, to consist of careful microscopic inspection with a mechanical stage of two smears, devoting at least three minutes to each smear made from selected particles (at least six from different parts) of the sputum on each of three successive days. The morning sputum should always be obtained, or, better, the minute bits that some patients raise at infrequent intervals. In case the findings are negative, the total amount of sputum collected on three successive days should be concentrated and examined microscopically. Animal inoculation or cultural implantation is desirable when indicated.

12. *Marked Impairment of Function, Either Local or Constitutional:* Local: Marked dyspnea on exertion, limiting seriously the patient's activity.

Constitutional: Marked weakness, anorexia, tachycardia.

Under Apparently Cured, Arrested and Apparently Arrested

13. *Constitutional Symptoms:* These include elevation of temperature, loss of weight, loss of strength, night sweats, chills, tachycardia, cyanosis, loss of appetite, amenorrhea, etc.

14. *Ordinary Conditions of Life:* This term as used implies that the patient is able to live in an environment where he is able to support himself without the assistance of others, or to live in his former surroundings and pursue his former occupation.

15. *Physical Signs of a Healed Lesion:* These may embrace every physical sign of infiltration or consolidation with the exception of rales, which must be permanently absent, except possibly a few fine rales at the base, probably atelectatic in origin and at one apex or over a small part of one lung. (See definition No. 2.) Fine rales in the latter two places are to be heard only during cough, at the end of prolonged expiration or during the inspiration which follows cough.

There are no certain criteria of a healed lesion, and this definition has its exceptions.

16. *Apex:* That portion of the lung situated above the clavicle and the third thoracic spine.

17. *Roentgen Findings Compatible with Physical Signs of a Healed Lesion:* Roentgenograms to show clearing, fibrosis, calcification or a stationary condition.

UNDER IMPROVED

18. *Constitutional Symptoms Lessened or Entirely Absent:* Improvement in general condition as shown either by gain in both weight and strength or by reduction of previous febrile temperature to normal without loss of strength.

UNDER UNIMPROVED

19. *Essential Symptoms:* These include among others, loss of weight, impairment of strength and appetite, night sweats, hemoptysis, pleurisy, dyspnea, fever, tachycardia, cough and expectoration.

THE DETAILED X-RAY CLASSIFICATION

The two main divisions into which fall all cases showing *x*-ray changes due to tuberculosis are the parenchymatous and peritruncal types. Descriptions of these cases are given later on. They indicate the character of the disease and the following abbreviations are used: Peritruncal–Pt; parenchymatous–Pc. Each of these types has three subdivisions, according to extent, 1, 2 and 3. The total extent is enumerated after the type of disease is recorded, viz., Pt–3. The extent in each lung is enumerated as a subfigure, viz., Pt–3, R_2L_2 or Pc–3 R_2L_2, etc.

When parenchymatous disease is present no note is made of the peritruncal lesion. When the evidence is questionable a question mark (?) is placed after the type in question, viz., Pc–?.

When neither peritruncal nor parenchymatous disease is present the report is classified as negative.

When hazy shadows or mottling are seen around an enlarged root the lesion is classified as parenchymatous.

TYPES OF LESIONS

Peritruncal. The evidence of structural changes follows definitely the ramifications of the trunks. The shadows are linear in character. The change in structure is evidenced by accentuation of the linear markings, with or without beading or studding and with or without haziness or clouding.

Parenchymatous. The evidence of change of structure assumes no characteristic shape nor do the shadows assume a linear character or follow the trunk shadows. The spaces between the linear markings contain shadows of irregular shape. The most frequent change noted is an irregular mottling, with or without haziness around the tubercle. (Note: The peritruncal type may be likened to the bark of a tree, the parenchymatous type to its leaves. Lewis Gregory Cole.)

Negative. When neither peritruncal nor parenchymatous lesions are present the plate is considered negative. The plates may, however, show:

(*a*) Discrete shadows at the root or within a radius of one to one and a half inches from the root.

(*b*) Calcified tubercle of small size scattered here and there in the lung fields.

(*c*) Diaphragmatic adhesions.

(*d*) Lessened transmission of ray, due to pectoral shadows, improper breathing, etc.

A. Pt = Peritruncal. (Linear changes only.)

1. Paravertebral trunk on one or both sides (R or L, RL) or first interspace trunk on one or both sides (R or L, RL) or second interspace trunk on one or both sides (R or L, RL) or paravertebral and first interspace trunks on one side (R or L).

2. (*a*) Paravertebral and first interspace trunks on both sides (RL) (or *b*) Paravertebral, first and second interspace trunks on one side (R_2 or L_2).

B. Pc = Parenchymatous—irregular—mottling.

1. Sixty to eighty sq. cm.—one or two interspaces:

(*a*) To the upper level of the first chondrosternal junction on one or both sides (R or L, RL).

(*b*) To the upper level of the second chondrosternal junction on one side (R or L).

2. Greater than No. 1 and including:

(*a*) To the upper level of the second chondrosternal junction on both sides (RL).

(*b*) To the upper level of the third chondrosternal junction on one side (R_2 or L_2).

(*c*) When more than to the upper level of the second but less than to the upper level of the third chondrosternal junction on one side a small amount may be present on the other side; if the total area is not greater than to the third chondrosternal junction on one side (R_2L, or RL_2).

3. An area greater in extent than No. 2.

(*a*) To the upper level of the third chondrosternal junction on one side and to the level of the second chondrosternal junction on the other (R_2L or RL_2).

(*b*) To the upper level of the third chondrosternal junction on both sides (R_2L_2).

(*c*) More than to the level of the third chondrosternal junction on one side and to the upper level of the second chondrosternal junction on the other (R_3L or RL_3).

(*d*) More than to the upper level of the third chondrosternal junction on one side and to the upper level of the third chondrosternal junction on the other (R_3L_2 or R_2L_3).

(*e*) More than to the upper level of the third chondrosternal junction on one or both sides (R_3, or L_3, or R_3L_3).

The intensity of the lesion is represented by the letters a (slight amount); b (moderate amount); c (consolidation, cavity); f (fibrosis, marked).

The susceptibility of the lesion to change for better or worse (focal change) is represented by the suffixes: O– change unlikely (healed? lesions); 1– change not very likely (mildly active); 2– change likely (moderately active); 3– change very likely (very active).

These suffixes are added to the letter representing the extent of the lesion.

Both extent and activity (?) are given for each side upon admission and discharge. So that by comparing the two any change in the *x*-ray may be readily seen, viz.:

Admission: Pc–3, R_2, a_2; L_2, b_3.

Discharge: Pc–3, R_2, a_1; L_2, b_2.

The Roman numeral under Turban (I, II, III) refers to the physical signs only (Turban-Gerhardt) and the suffixes 1, 2, 3 under R and L to the number of lobes of each side showing involvement by physical signs, viz.:

(P) Mod. Adv., II, R_2, L_2.

(R)

SUMMARY OF THE MEDICAL REPORT OF TRUDEAU SANATORIUM

For the Year Ending October 31, 1924

Number of patients treated during the year	415
Number of patients in Sanatorium, October 31, 1924	147
Number of patients to be reported upon for the year	268

An analysis of the records of these 268 discharged patients discloses the following:

Condition.	Cases.		Per cent.
Not classified (one day)	1	=	0.37
Demonstrable non-clinical tuberculosis	1	=	0.37
Non-tuberculous	17	=	6.35
Suspected tuberculosis	11	=	4.10
Apparently arrested (formerly apparently cured)	56	=	20.89
Quiescent (formerly arrested)	126	=	47.02
Disease improved	21	=	7.84
Disease unimproved	32	=	11.94
Dead	3	=	1.12
	268	=	100.00

Note.—These include 7 patients who remained less than 30 days, 44 patients who remained from 30 to 90 days, 215 patients who remained over 90 days and 2 convalescent patients who remained with extended time. These are classified as follows:

Class I.—Patients who remained less than 30 days.
Class II.—Patients who remained from 30 to 90 days.
Class III.—Patients who remained over 90 days.
Class IV.—Patients (convalescents) who remained with extended time.

Class I.—7 Patients Who Remained Less than 30 Days and about Whom no Detailed Reports are Given

Condition on admission.	Cases.		Per cent.	Condition on discharge.	Cases.		Per cent.
Not classified (1 day)	1	=	14.2	Not classified	1	=	14.2
Non-tuberculous	2	=	28.6	Non-tuberculous	2	=	28.6
Suspected tuberculosis	1	=	14.3	Suspected tuberculosis	1	=	14.3
Minimal	2	=	28.6	Quiescent	1	=	14.3
Far advanced	1	=	14.3	Unimproved	2	=	28.6
	7	=	100.0		7	=	100.0

Note.—Patients with a diagnosis of "non-tuberculous" or "suspected tuberculosis" or "non-clinical tuberculosis" usually remain for a period of less than three (3) months.

Class II.—44 Patients Who Remained from 30 to 90 Days (Average Term of Residence 60 Days)

Condition on admission.	Cases.		Per cent.	Condition on discharge.	Cases.		Per cent.
Demonstrable non-clinical tuberculosis	1	=	2.3	Demonstrable non-clinical tuberculosis	1	=	2.3
Non-tuberculous	12	=	27.3	Non-tuberculous	12	=	27.3
Suspected tuberculosis	7	=	15.9	Suspected tuberculosis	7	=	15.9
Minimal	8	=	18.1	Apparently arrested	3	=	6.8
Moderately advanced	13	=	29.6	Quiescent	12	=	27.2
Far advanced	3	=	6.8	Improved	3	=	6.8
				Unimproved	5	=	11.4
				Dead	1	=	2.3
	44	=	100.0		44	=	100.0

22 gained an average of 4 pounds, 20 lost an average of $3\frac{5}{8}$ pounds and 2 remained stationary in weight.

Case III.—215 Patients Who Remained Over 90 Days (Average Term of Residence 212 Days)

Condition on admission.	Cases.		Per cent.	Condition on discharge.	Cases.		Per cent.
Non-tuberculous	3	=	1.4	Non-tuberculous	3	=	1.4
*Suspected tuberculosis	4	=	1.9	Suspected tuberculosis	3	=	1.4
Minimal	27	=	12.6	Apparently arrested	53	=	24.7
Moderately advanced	151	=	70.2	Quiescent	112	=	52.1
Far advanced	30	=	13.9	Improved	18	=	8.4
				Unimproved	24	=	11.1
				Dead	2	=	0.9
	215	=	100.0		215	=	100.0

132 gained an average of 8⅜ pounds, 77 lost an average of 5⅜ pounds and 6 remained stationary in weight.

Class IV.—2 Convalescent Patients Who Remained with Extended Time (Average Term of Residence 344 Days)

Condition on admission.	Cases.	Condition on discharge.	Cases.
Moderately advanced	2	Quiescent	1
		Unimproved	1

Applicants for Admission

New cases examined at the Sanatorium	291
Cases reëxamined at the Sanatorium	13
Total examinations	304

Patients who were discharged during the past year came from the following states and countries: Albama, 1; Connecticut, 4; District of Columbia, 4; Georgia, 2; Illinois, 3; Indiana, 2; Iowa, 1; Kentucky, 1; Maine, 1; Maryland, 5; Massachusetts, 9; Michigan, 4; Minnesota, 4; Mississippi, 1; Missouri, 1; New Jersey, 24; New York City, 99; New York State (other than New York City), 43; North Carolina, 4; Ohio, 11; Pennsylvania, 23; Rhode Island, 2; South Carolina, 1; Tennessee, 2; Virginia, 4; West Virginia, 2; Canada, 7; Cuba, 1.

Of the above patients 36 served in the Army, Navy or Marine Corps during the World War.

Number of patients discharged		268
"A" patients, having had previous treatment at Sanatorium	28	
"B" patients, remaining less than 30 days	7	
"E" patients, convalescents, remaining overtime	2	
Patients (including patients remaining for continuous treat-treatment)	231	

* 1 suspected tuberculosis subsequently diagnosed as minimal.

DISTRIBUTION OF THE LESIONS

Fred H. Heise, M.D., Resident Physician.

An analysis was made to determine to what extent the tuberculous lesion had advanced at the time of entrance of 244 unselected tuberculous patients included in this report. The *x*-ray examination was the only test used (physical signs were not employed) and the character of the lesion was not considered. Only 56 (23 per cent) of the 244 cases were unilateral. Of these the lesion was of no greater extent than to the upper level of the third rib in 40 (16 per cent), [R 18 (7 per cent): L 22 (9 per cent)]. The lesion extended beyond the third rib in 12 (5 per cent) of which 8 (3 per cent) were on the right side and 4 (2 per cent) on the left side. The lesion was confined to the central zone of the left side in 1 instance and to the base of the right side in 2 and to the base of the left side in 1.

By far the greater number of patients had bilateral disease. The extent on each side was no greater than to the third rib in 65 (27 per cent), and more extensive than to the third rib in 34 (14 per cent). When one side was involved beyond the third rib and the other not, the more extensive lesion was found on the right side in 29 (12 per cent), and the left side 36 (15 per cent). In some instances the top of one lung and the contralateral base were alone involved. Right top and left base were involved in 3 (1 per cent); left top and right base in 1 (½ per cent). Right top and left center were involved in 9 (4 per cent); left top and right center in 1 (½ per cent). The entire right lung and left center were involved in 4 (2 per cent); the left lung and right center in 5 (2 per cent). Right lung and left base were affected in 1 (½ per cent); left lung and right base in no instance. There were no cases in which the lesions were confined to both centers or bases.

Thus of 244 cases entering Trudeau, only one-fourth (56 or 23 per cent) possessed unilateral lesions. In the majority of these cases (40) the lesion was confined above the third rib. Very few instances (4) of the central or basal portions of the lung being alone involved were seen.

Three-quarters of these 244 cases had bilateral lesions. The lesion was confined above the third rib in 65 or 27 per cent, and extended below the third rib of each side to the same extent in 34 or 14 per cent. It would seem, therefore, that in these 99 cases the lesions began and advanced simultaneously but not necessarily with the same intensity on both sides or that one side was held in abeyance until the other side advanced to a like degree. One side being at first involved and later the second. The method of advance on each side seems to have been by contiguity.

One side advanced to a greater extent than the other in 65 or 27 per cent. Right and left sides were about equally divided as to the greater extent. What seemed to be an advance of the lesion from one top to the opposite center or base, or from one lung to the opposite center or base took place in only 24 instance (10½ per cent).

In no instances were both centers or bases involved alone.

How and when do the unilateral cases become bilateral, or are some cases of tuberculosis bilateral at the start? These questions cannot be answered from this analysis. It can be said, however, that but few remained unilateral although the disease had apparently not gone beyond the third rib of one or both sides in nearly one-half (43 per cent). It can also be said that extension by cross-firing (top of one side to base or center of the opposite) took place rather infrequently (8 per cent). The cases included in this analysis represent, for the most part, the nodular or reproductive type of tuberculosis. Only those patients are admitted to Trudeau who have the "earlier" types of lesions and are not acutely ill.

THE DIAGNOSTIC VALUE OF SMALL NUMBERS OF TUBERCLE BACILLI IN THE SPUTUM

Fred H. Heise, M.D., Resident Physician

Just how many tubercle bacilli must be discovered in the sputum before a positive diagnosis can be made is still an argumentative question. Naturally an abundance of them, when once found, should settle all doubt. Occasionally however from only 1 to 4 or 5 bacilli are discovered after diligent search of 2 smears and their significance is seriously questioned by some inasmuch as improper staining and decolorizing methods may be at fault. To ascertain the diagnostic importance of finding 1 to 4 tubercle bacilli in the sputum, an analysis was made of a number of cases having at any time during their stay at the Sanatorium a sputum analysis showing only 1 to 4 tubercle bacilli in the specimen.

In all, 1800 cases were considered. Of these 202 at some time submitted a sputum specimen in which less than 5 tubercle bacilli were found. Examination of the sputum upon entrance to the Sanatorium revealed 71 of these, whereas the remaining 131 submitted specimens later during their residence at the Sanatorium. Of the 71 submitting specimens containing less than 5 tubercle bacilli upon entrance to the Sanatorium, 28 per cent later submitted similar specimens and 56 per cent submitted specimens in which more than 4 bacilli were found. So that in 56 per cent of these cases diagnosis could be made later on sputum findings alone. However, 72 per cent could be diagnosed by physical signs and 93 per cent by *x*-ray examination, while 46 per cent has a definite history of hemoptysis or pleurisy with effusion. Only 1 case could not be diagnosed by either of the above methods or the subsequent finding of a greater number of tubercle bacilli in the sputum (1.4 per cent).

Less than 5 tubercle bacilli were found in 131 specimens submitted after the first week of residence. Of the patients submitting these specimens 17 per cent submitted similar specimens later. More than 4 bacilli were found at a previous or subsequent examination in 74 per cent. The diagnosis could be established by physical signs in 75 per cent, by *x*-ray in 93 per cent and by the occurrence of hemoptysis or pleurisy with effusion in 45 per cent. In three instances the diagnosis could not be made by either of the above methods nor by the subsequent finding of a greater number of tubercle bacilli (2 per cent).

So that it can be said that of 202 patients submitting sputum specimens in which, after proper staining and decolorizing methods, less than 5 tubercle bacilli were found, the diagnosis could be substantiated in approximately 98 per cent by either physical signs, *x*-ray findings, or the history, or a combination of these, or by the occurrence at some other time of a greater number of tubercle bacilli in the sputum.

Of 36 patients in whose sputum only 1 tubercle bacillus could be found, 35 (97 per cent) could be diagnosed by the finiding of more tubercle bacilli at some other time, or by the other methods of examination.

OCCURRENCE AND VALUE OF FINDING LESS THAN FIVE TUBERCLE BACILLI IN THE SPUTUM OF 1800 CASES

Specimen Submitted During First Week of Residence

Number of bacilli found	1	2	3	4
Number of cases	11	21	22	17
Diagnosable by:				
Physical signs	2	0	0	2
X-ray	2	3	2	1
History		0	0	0
Physical signs and *x*-ray	4	8	10	3
Physical signs and history	0	0	0	0
X-ray and history	1	1	3	2
Physical signs, *x*-ray and history	2	8	7	9
Not diagnosable	0	1	0	0
Subsequent finding of greater number of bacilli	5	10	13	12

Specimens Submitted After the First Week of Residence

Number of bacilli found	1	2	3	4
Number of cases	25	46	36	24
Diagnosable by:				
Physical signs	1	1	1	0
X-ray	2	5	5	2
History	0	2	0	0
Physical signs and *x*-ray	8	17	12	15
Physical signs and history	1	0	0	0
X-ray and history	6	5	1	2
Physical signs, *x*-ray and history	6	15	16	5
Not diagnosable	1	1	1	0
Subsequent finding of greater number of bacilli	12	35	30	20

TWENTIETH MEDICAL SUPPLEMENT

OF THE

FORTIETH ANNUAL REPORT

OF THE

Trudeau Sanatorium

FOR THE YEAR ENDING OCTOBER 31, 1924

Prepared in accordance with the suggestions of the National Tuberculosis Association

FRED H. HEISE, M.D.

1924

No. Sex Age	Occupation Marital condition Onset		Condition	Extent of physical signs (Turban)		Duration of disease, months	General condition	Digestion	Weight		Range of pulse 7 days on admission 2 days on discharge	Av. max. temp. 7 days on admission 2 days on discharge	T. B.			Exercise in minutes	Complications	Tuberculin O. T. maximum dose or other treatment	Complement fixation	X-ray findings	
				Both lungs	Each lung				Actual	Standard			Previous	Admission—Discharge	Residence					Both lungs	Each lung
6120 A	Housewife, M	A	P.R. Far Adv. B	III	$R_3 L_2$	23	Unfavor.	Unimpaired	97¼	135½	72–96	99.6	+	+	+	..	....	....	4+	Pc3	$R_3 c_2 L_3 b_2$
F., 54	Catarrhal	D	Quiescent	II	R_3	31	Unfavor.	Unimpaired	129¾	...	72–88	98.7	..	○	..	5	....	Ultra-violet ray	..	R. & L-clear.	
6182	Clerk, S.	A	R. Mod. Adv. A.	...	....	5	Favor.	Unimpaired	171¼	160	70–88	98.4	○	+	+	..	....	....	3+	Pc2	$R_1 b_1 L_1 b_1$
M., 21	Insidious	D	Improved	III	R pneumothorax x L_2	24	Favor.	Unimpaired	152¾	...	82–94	98.8	..	○	..	..	....	....	...	R pneumothorax	L-clear.
6197	Clerk, S.		P.R. Mod. Adv. A.	I	L_1	10	Favor.	Unimpaired	140¼	158½	60–80	98.3	+	+	+	..	....	....	4+	c2	$R_1? a_0 L_2 b_2$
M., 20	Catarrhal		Quiescent	I	L_2	22	Favor.	Unimpaired	141	...	66–84	98.7	..	+	..	Unlimited	......	Ultra-violet ray	...	R-stat. L-inc.	
6199	Teacher, M.	A	P.R. Mod. Adv. A.	II	$R_1 L_2$	48	Favor.	Unimpaired	155¼	188	72–88	98.7	+	+	+	..	....	....	4+	Pc3	$R_2 b_1 L_3 b_2$
M., 49	Insidious	D	Unimproved	III	$R_2 L_2$	55½	Favor.	Unimpaired	146¼	...	72–82	98.5	..	○	..	15	Colitis (Tbc.)	Ultra-violet ray	...	R. & L-clear.	
6222	Student, S.	A	P.R. Mod. Adv. A.	...	....	4	Favor.	Unimpaired	156½	149	72–104	98.6	+	○	+	..	....	....	4+	Pc3	$R_2 b_1 L_2 b_1$
M., 19	Catarrhal	D	Unimproved	...	....	12½	Favor.	Unimpaired	144½	...	76–92	98.7	..	+	..	..	....	Ultra-violet ray	...	R-clear. L-clear & inc.	
6224	Student, S.	A	R. Mod. Adv. A.	...	...	4	Favor.	Unimpaired	129½	132	76–112	98.7	..	○	○	..	....	....	–	Pc3	$R_3 b_2 L_2 b_2$
M., 17	Catarrhal	D	Ap. Arrested	...	....	12	Favor.	Unimpaired	132½	...	70–86	98.8	..	–	..	60	....	Ultra-violet ray	...	R. & L-clear.	
6226	Shipping Clerk, S.	A	P.R. Mod. Adv. A.	II	$R_2 L_0$	8	Favor.	Unimpaired	157¼	194	62–92	98.3	?	+	+	..	Neurasthenia	....	...	Pc3	$R_2 c?_2 L_1 b_1$
M., 26	Catarrhal	D	Improved	I	R	14½	Favor.	Unimpaired	157¾	...	76–88	98.1	..	+	..	..	Neurasthenia	Ultra-violet ray	...	R-inc.? clear.	L-stat.
6229	Auditor, S.	A	P.R. Far Adv. A.	III	$R_3 L_2$	72	Unfavor.	Unimpaired	117¾	150	62–104	99.7	+	+	+	..	Colitis (Tbc.)	....	...	Pc3	$R_3 c_2 L_3 c_2$
M., 28	Insidious	D	Improved	III	$R_3 L_2$	78	Unfavor.	Unimpaired	123¾	...	76–100	98.7	..	+	..	..	Colitis (Tbc.)	Ultra-violet ray	...	R-inc. clear.	L-clear.
6231	Student, S.	A	P.R. Far Adv. A.	II	L pneumothorax x	24	Favor.	Unimpaired	125¾	145	58–116	98.2	+	○	○	..	....	Pneumothorax	...	Pc3	R_2 L-pneumothorax
M., 17	Pleuritic	D	Improved	II	L pneumothorax x	30	Favor.	Unimpaired	128½	...	64–96	98.0	..	○	..	30	....	Pneumothorax	...	R-clear. L-stat.?	
6232	Stenographer, S.	A	R. Mod. Adv. A.	I?	$R_0 L_1?$	8	Favor.	Unimpaired	103½	134	62–96	98.6	+	+	○	..	....	....	–	Pc3	$R_2 b_1 L_2 b_1$
F., 26	Catarrhal	D	Ap. Arrested	...	....	17	Favor.	Unimpaired	126	...	72–88	98.2	..	–	..	Unlimited	......	Ultra-violet ray	...	R. & L-clear.	
6233	Houseworker, S.	A	R. Minimal A.	...	....	11	Favor.	Unimpaired	135¼	137	64–100	98.4	?	○	○	..	....	....	...	Pc2	$R_1 a_1 L_1 a_1$
F., 31	Pleuritic	D	Ap. Arrested	...	....	17	Favor.	Unimpaired	141	...	72–80	98.3	..	–	..	Unlimited	......	....	...	R. & L-stat.	

6234 M., 20	Salesman, S. Catarrhal	A D	P.R. Mod. Adv. A. Quiescent	II II	R_2 L_1 R_2	14 30	Favor. Favor.	Unimpaired Unimpaired	152¼ 152	154 ...	56–100 60–78	98.9 98.7	+ ..	+ ○	+ ..	.. Unli mited	Colitis (Tbc.)? Colitis (Tbc.)	.... Ultra-violet ray	...	Pc3 R. & L-clear.	R_3 b_2 L_2 b_1
6237 F., 31	Housewife, M. Insidious	A D	P.R. Mod. Adv. A. Quiescent	II ...	R_2 L_0	2 8¼	Favor. Favor.	Unimpaired Unimpaired	109¼ 114¾	127½ ...	72–92 72–78	98.4 98.7	+ ..	○ +	+ ..	.. 60	....	....	... ...	Pc3 R. & L-clear.	R_2 b_2 L_2 a_1
6238 M., 26	Footman, S. Hemoptoic	A D	P.R. Far Adv. A. Unimproved	III III	Ri L_2 R_3 L_2	1½ 12¾	Favor. Unfavor.	Unimpaired Unimpaired	140 125¼	147¼ ...	48–80 84–92	98.4 98.6	+ ..	+ +	+ ..	.. ..	.... Pleuritis	.... Ultra-violet ray	– ...	Pc3 R-stat. L-inc	R_3 b_1 L_3 b_2 .
6239 M., 26	Instructor, M. Catarrhal	A D	P.R. Mod. Adv. A. Improved	II II	L_2 L_2	54 69½	Favor. Favor.	Unimpaired Unimpaired	150¾ 165	180½ ...	72–96 66–80	98.8 98.3	+ ..	+ ○	+ ..	.. 15	.... Colitis (Tbc.)	.... Ultra-violet ray	– ...	Pc3 R. & L-clear.	R_2 b_1 L_3 b_2
6240 M., 24	Salesman, S. Catarrhal	A D	P.R. Mod. Adv. A. Quiescent	I I	R_3 R_2 L_1	7 12¾	Favor. Favor.	Unimpaired Unimpaired	170¼ 183	152¾ ...	72–104 60–78	99.0 98.2	○ ..	○ ○	○ ..	.. Unlimi	.... ted	.... Ultra-violet ray	... ...	Pc3 R-stat. L-cle	R_1 a_1 L_3 b_2 ar.
6241 F., 20	None, S. Insidious	A D	P.R. Mod. Adv. A. Ap. Arrested	I ...	L_1	12 26¼	Favor. Favor.	Unimpaired Unimpaired	121¾ 119	113¾ ...	72–104 66–80	99.1 98.5	+ ..	– –	– ..	.. Unlimi	.... ted	.... Ultra-violet ray	3+ ...	Pc3 R-stat. L-cle	R_1 a_1 L_3 b_1 ar.
6242 M., 30	Chauffeur, M. Catarrhal	A D	R. Mod. Adv. A. Quiescent	I I	R_1 L_1 R	10 21¾	Favor. Favor.	Unimpaired Unimpaired	186¾ 182½	166 ...	60–84 62–78	98.9 98.6	○ ..	○ ○	○ ..	.. Unlimi	.... ted	.... Ultra-violet ray	○ ...	Pc3 R. & L-clear	R_2 b_1 L_2 b_1 .
6243 F., 37	Clerk, S. Insidious, Post-flu.	A D	P. Minimal A. Ap. Arrested	... ...	....	60 66¼	Favor. Favor.	Impaired Unimpaired	126 126½	143 ...	68–88 65–82	98.4 98.5	○ ..	○ –	○ ..	... Unlimi	.... ted	....	○ ...	Pc2 R-clear. L-st	R_1 a_1 L_1 a_0 at.
6244 F., 27	Registered Nurse, S Insidious	A D	P.R. Minimal A. Improved	I II	L_1 L_2 pneu- mothora	10 24½ x	Favor. Favor.	Unimpaired Unimpaired	129 133	129¾ ...	68–92 84–96	98.0 98.2	○ ..	○ ○	+ ..	.. C .. T C	hr. purulent otit bc. laryngitis olitis (Tbc.)	is media ... Ultra-violet ray Pneumothorax	○ ...	Pc1 R-stat. L-pn	L_1 b_1 eumothorax
6246 M., 24	Pharmacist, S. Hemoptoic	A D	P.R. Minimal A. Ap. Arrested	I ...	R_0 L_1	24 29¼	Favor. Favor.	Unimpaired Unimpaired	163¼ 167	152½ ...	60–84 60–78	98.6	– ..	– ○	○ ..	.. Unlimi	.... ted	....	○ ...	Pc1 R. & L-stat.	L_1 a_0
6249 M., 21	Student, S. Catarrhal	A D	R. Mod. Adv. A. Quiescent	I I	R_2 R	11 21½	Favor. Favor.	Unimpaired Unimpaired	162¼ 159¾	151 ...	68–88 64–78	98.6 98.6	+ ..	+ ○	+ ..	.. Unlimi	.... ted	....	○ ...	Pc3 R-clear. L-st	R_3 b_2 L_1 a_1 at.
6250 M., 44	Clothier, M. Catarrhal	A D	R. Mod. Adv. A. Quiescent	I? I	L_1? R	7 12	Favor. Favor.	Unimpaired Unimpaired	119¾ 134¾	152 ...	64–76 68–72	98.5 98.3	+ ..	+ +	+ ..	.. Unlimi	.... ted	....	○ ...	Pc3 R-stat. L-cle	R_3 b_1 L_2 b_2 ar.
6251 M., 27	Physician, S. Catarrhal	A D	P.R. Mod. Adv. A. Quiescent	II I	R_1 L_2 R	3 9¾	Favor. Favor.	Unimpaired Unimpaired	161 174	164¾ ...	60–88 60–78	98.2 98.1	○ ..	+ +	+ ..	.. Unlimi	.... ted	....	4+ ...	Pc3 R-inc.? L-sta	R_3 b_1 t.
6252 F., 32	Musician, M. Insidious	A D	R. Mod. Adv. A. Quiescent	I I	L_1 L	7 13¾	Favor. Favor.	Unimpaired Unimpaired	129½ 126½	128 ...	72–92 76–83	98.9 98.5	○ ..	○ ○	+ ..	.. Unli- mited	Colitis (Tbc.)? Colitis (Tbc.)	....	○ ...	Pc3 R. & L-clear.	R_3 a_1 L_3 b_1

R = Patients having intensive rest treatment during first six weeks of residence.

No. Sex Age	Occupation Marital condition Onset		Condition	Extent of physical signs (Turban)		Duration of disease, months	General condition	Digestion	Weight		Range of pulse 7 days on admission 2 days on discharge	Av. max. temp. 7 days on admission 2 days on discharge	T. B.			Exercise in minutes	Complications	Tuberculin O. T. maximum dose or other treatment	Complement fixation	*X*-ray findings	
				Both lungs	Each lung				Actual	Standard			Previous	Admission—Discharge.	Residence					Both lungs	Each lung
6257 M., 36	Stage hand, D. Hemoptoic	A D	P.R. Mod. Adv. A. Quiescent	II II	R_2 L_2 R L	72 87	Favor. Favor.	Unimpaired Unimpaired	126 128¾	147 . . .	76–100 84–100	98.2 98.2	+ . .	○ ○	○ . .	. . Unli	. . . . mited	. . . . Ultra-violet ray	– . . .	Pc3 R. & L-clear.	R_2 b_1 L_2 b_1
6259 M., 24	Steamship Clerk, S Pleuritic	A D	R. Mod. Adv. A. Quiescent	I I	R_1 L_1 R	8 13½	Favor. Favor.	Unimpaired Unimpaired	145 166½	143¼ . . .	72–88 68–82	98.8 98.3	+ . .	+ ○	+ . .	. . 60	. . . .	. . . .	○ . . .	Pc3 R-pleurisy L	R_2 b_2 L_2 b_2 -clear.
6260 M., 23	Broker's Clerk, S. Pleuritic	A D	P.R. Mod. Adv. A. Quiescent	II II	R_1 L_2 R_1 L_1	24 30	Favor. Favor.	Unimpaired Unimpaired	122 119½	149½ . . .	56–84 70–84	99.0 98.6	+ . .	○ ○	○ . .	. . 45	. . . .	. . . .	4+ . . .	Pc3 R-stat. L-cle	R_3 a_1 L_2 a_1 ar.
6261 M., 18	College Student, S. Catarrhal	A D	C. Far Adv. A. Ap. Arrested	. . . . . .	. . . .	6 16	Favor. Favor.	Unimpaired Unimpaired	158 166½	151 . . .	60–88 60–74	98.6 98.1	? . .	○ +	○ . .	. . Unli mite	Colitis (Tbc.) Colitis (Tbc.) d	Ultra-violet ray	○ . . .	Pc3 R-clear. L-st	R_2 c_2 L_1 a_1 at.
6262 M., 24	Shipping Clerk, M. Catarrhal	A D	P.R. Mod. Adv. A. Quiescent	I I	R_2 L_1 R	6 15	Favor. Favor.	Unimpaired Unimpaired	146 159¾	139 . . .	64–84 62–84	98.5 98.0	– . .	– ○	+ . .	. . Unli	. . . . mited	. . . . Ultra-violet ray	4+ . . .	Pc3 R. & L-clear.	R_3 b_1 L_3 b_1
6265 M., 22	Med. Student, S. Pleuritic	A D	P.R. Mod. Adv. A. Quiescent	I I	L_1 L_1	24 38½	Favor. Favor.	Unimpaired Unimpaired	155 159	158 . . .	60–88 62–80	98.7 98.2	+ . .	+ ○	+ . .	. . Unli	. . . . mited	. . . . Ultra-violet ray	4+ . . .	Pc3 R-stat. L-cle	R_1 a_0 L_3 b_1 ar.
6266 F., 32	Housewife, M. Insidious	A D	R. Mod. Adv. A. Improved	I I	R_1 R_1	36 42¼	Favor. Favor.	Unimpaired Unimpaired	107 109¼	122 . . .	64–110 74–98	99.2 99.5	– . .	+ ○	+ . .	. . . .	. . . .	. . . .	. . . . . .	Pc3 R-clear. L-st	R_2 b_1 L_1 a_1 at.
6268 M., 24	Shipping Clerk, S. Catarrhal	A D	P.R. Mod. Adv. A. Improved?	I I	R_2 R_2	2½ 8¼	Favor. Favor.	Unimpaired Unimpaired	147½ 155½	148 . . .	70–96 70–84	98.5 98.5	+ . .	– +	+ . .	. . Unli	. . . . mited	. . . . Ultra-violet ray	4+ . . .	Pc3 R-clear. & in	R_3 b_2 L_1 a_0 c. L-stat.
6269 F., 34	Housewife, M. Insidious	A D	P.R. Mod. Adv. A. Improved	II III	R_2 L_2 R_2 L_2	96 102¼	Favor. Favor.	Impaired Unimpaired	105½ 123½	126½ . . .	60–114 76–92	98.9 98.5	+ . .	+ +	+ . .	. . . .	Neurasthenia Neurasthenia	. . . .	4+ . . .	Pc3 R. & L-stat.	R_2 b_1 L_3 b_1
6270 M., 18	Student, S. Catarrhal	A D	P.R. Mod. Adv. A. Quiescent	I I	R_2 R	8 16	Favor. Favor.	Unimpaired Unimpaired	171 171¾	156 . . .	60–88 62–80	98.6 98.1	+ . .	○ –	+ . .	. . Unli	. . . . mited	. . . .	○ . . .	Pc3 R-clear ? inc.	R_3 c_2 cav. L-stat.
6271 F., 22	Maid, S. Insidious	A D	P.R. Mod. Adv. A. Quiescent	I I	R_1 R_1	16 21¾	Favor. Favor.	Unimpaired Unimpaired	120¾ 125¼	135½ . . .	60–82 70–88	98.6 98.6	– . .	○ ○	○ . .	. . 45	. . . .	. . . .	4+ . . .	Pc3 R-clear. L-st	R_3 b_2 L_1 a_1 at.
6272 M., 22	Secretary, S. Pleuritic	A D	P. Mod. Adv. A. Quiescent	I I	L_2 L	30 34	Favor. Favor.	Unimpaired Impaired	136 143¼	166½ . . .	60–88 64–82	98.9 98 6	– . .	– ○	○ .	. . 60	. . . .	. . . .	4+ . . .	Pc1 R-stat. L-cle	L_1 b_1 ar.

6273 M., 22	College Student, M Hemoptoic	A D	R. Far Adv. A. Quiescent	II III	L_2 R_1 L_2	4½ 19	Favor. Favor.	Unimpaired Unimpaired	131 133½	153½ ...	72–108 60–72	99.0 98.4	+ ..	+ ○	+ ..	.. Unlimited	Colitis (Tbc.) Colitis (Tbc.)	.... Ultra-violet ray	4+ ...	Pc3 R-clear. L-in	R_3 b_1 L_3 b_2 c.
6274 F., 35	Secretary, S. Pleuritic	A D	P.R. Mod. Adv. A. Quiescent	II II	L_2 L_2	24 30½	Favor. Favor.	Unimpaired Unimpaired	137 140	128½ ...	60–100 72–88	99.1 98.6	+ ..	+ +	+ ..	.. 20	Neurasthenia Neurasthenia	....	○ ...	Pc3 R-stat. L-cle	R_1 a_0 L_3 b_1 ar. & inc. pleurisy
6275 M., 34	Physician, M. Catarrhal	A D	P.R. Mod. Adv. A. Quiescent	II I	L_2 L_1	8½ 15¼	Favor. Favor.	Unimpaired Unimpaired	182 182	176¾ ...	64–80 62–76	99.0 98.6	+ ..	○ ○	○ ..	.. Unlimi	.... ted	....	○ ...	Pc3 R-stat. L-cle	R_1 a_1 L_3 b_1 ar.
6276 F., 37	Stenographer, S. Catarrhal	A D	P.R. Mod. Adv. A. Quiescent	II II	R_1 L_2 R_1 L_1	9 23	Favor. Favor.	Unimpaired Unimpaired	138 152	136 ...	64–92 66–80	98.7 98.6	○ ..	○ ○	○ ..	.. Unlimi	.... ted	....	4+ ...	Pc3 R. & L-clear.	R_1 b_1 L_2 b_1
6277 M., 21	Theo. Student, S. Insidious	A D	C. Far Adv. A. Improved	II III	R_2 R pneumothorax L_1	14 24	Favor. Favor.	Impaired Unimapired	137 142½	164½ ...	76–104 68–82	99.0 97.8	+ ..	+ +	+ ..	.. 30	Colitis (Tbc.) Colitis (Tbc.)	Ultra-violet ray Pneumothorax	2+ ...	Pc3 R-inc.dev.an fibrosis L-s	R_3 c_2 L_1 a_1 n. shadow more tat.
6279 M., 19	Blue printer, S. Catarrhal	A D	P.R. Mod. Adv. A. Quiescent	II I	R_1 L_1 L_2	3 11¼	Favor. Favor.	Unimpaired Unimpaired	164 161¾	150 ...	56–90 60–74	98.2 98.1	+ ..	+ –	+ ..	.. Unlimited	.... Colitis (Tbc.)	.... Ultra-violet ray	○ ...	Pc3 R. & L-clear.	R_3 a_1 L_3 b_2 ?
6280 F., 38	Buyer, S. Insidious	A D	R. Mod. Adv. A. Unimproved	I I	R_1 R	24 35	Favor. Favor.	Unimpaired Unimpaired	118¼ 136½	137 ...	62–100 72–92	98.5 98.4	+ ..	+ ○	+ ..	.. ..	....	.... Ultra-violet ray	○ ...	Pc3 R. & L-stat.	R_3 b_1 L_1 a_0
6282 F., 21	Telephone oper., S. Insidious	A D	P.R. Mod. Adv. A. Quiescent	II I	R_2 R	30 34½	Favor. Favor.	Impaired Unimpaired	104½ 101	119¼ ...	56–80 65–72	98.9 98.4	○ ..	○ –	+ ..	.. Unlimi	.... ted	....	... ...	Pc2 R. & L-stat.	R_2 a_1
6283 F., 28	Saleswoman, S. Catarrhal	A D	P.R. Mod. Adv. A. Unimproved	II II	R L L_2	21 27½	Favor. Favor.	Impaired Unimpaired	135 140½	126 ...	68–120 84–100	100.0 98.6	+ ..	+ +	+ ..	.. ..	.... Pleuritis	....	... ...	Pc3 R-stat. L-? in pleurisy	R_2 a_1 L_3 b_1 c. possibly part
6285 M., 37	Farmer-Teacher, M Post-influenza	A D	C. Far Adv. A. Quiescent	III II	R_1 L_2 R_1 L_2	54 60	Favor. Favor.	Impaired Unimpaired	140 145	154½ ...	64–88 66–78	98.0 97.9	+ ..	+ +	+ ..	.. Unlimited	Colitis (Tbc.) Colitis (Tbc.)	.... Ultra-violet ray	○ ...	Pc3 R-clear inc.?	R_2 b_1 L_1 a_0 cavity, L-clear.
6286 F., 23	Registered Nurse, S Pleuritic	A D	R. Mod. Adv. A. Quiescent	I ...	R_1	7 10¾	Favor. Favor.	Impaired Unimpaired	114¾ 118	130 ...	64–96 68–88	98.5 98.6	+ ..	+ +	○ ..	.. 60	....	....	3+ ...	Pc2 R. & L-stat.	R_2 b_1
6288 F., 30	Clerk, M. Insidious	A D	R. Mod. Adv. A. Ap. Arrested	... ...	....	9 18½	Favor. Favor.	Impaired Unimpaired	132 144	132¼ ...	68–92 68–82	98.4 98.8	+ ..	○ ○	– ..	.. Unlimi	.... ted	.... Ultra-violet ray	○ ...	Pc2 R-stat. L-cle	L_2 b_1 ar.
6289 F., 16	Student, S. Pleuritic	A D	R. Far Adv. B. Improved	I ...	R_1	9 17⅔	Unfavor. Favor.	Impaired Unimpaired	82½ 95	? ...	88–120 88–100	100.1 98.2	– ..	+ ○	+ ..	.. 15	Colitis (Tbc.) Colitis (Tbc.)	.... Ultra-violet ray	○ ...	Pc3 R-clear. L-cl ness prob. p	R_1 a_1 L_2 c_2 ear. dev. hazi- leuritic

R = Patients having intensive rest treatment during first six weeks of residence.

No. Sex Age	Occupation Marital condition Onset		Condition	Extent of physical signs (Turban)		Duration of disease, months	General condition	Digestion	Weight		Range of pulse 7 days on admission 2 days on discharge	Av. max. temp. 7 days on admission 2 days on discharge	T. B.			Exercise in minutes	Complications	Tuberculin O. T. maximum dose or other treatment	Complement fixation	X-ray findings	
				Both lungs	Each lung				Actual	Standard			Previous	Admission—Discharge	Residence					Both lungs	Each lung
6290	Housewife, M.	A	R. Far Adv. A.	I	L_2	12	Favor.	Unimpaired	103¼	126	68–96	98.6	–	○	+	..	....	....	–	Pc3	R_3 a_1 L_3 b_1
F., 22	Insidious	D	Improved	II	L_2	21¼	Favor.	Unimpaired	115½	...	76–86	98.9	..	○	..	45	Pleurisy-tbc.	....	...	R. ? clear. L?	clear. & inc.
																	laryngitis			pleurisy	
6291	Benchworker, S.	A	P.R. Mod. Adv. B.	II	R_2	15	Favor.	Unimpaired	111	130	76–104	99.0	○	+	○	..	....	....	○	Pc3	R_3 c_2 L_1 a_1
F., 18	Insidious	D	Quiescent	II	R_2	21¼	Favor.	Unimpaired	130	...	80–88	98.6	..	+	..	30	....	Ultra-violet ray	...	R-inc. of ann	ular shadow &
																				clear. L-sta	t.
6292	Teacher, S.	A	P.R. Mod. Adv. A.	I	R_1 L_1	22	Favor.	Impaired	173	142	60–92	98.7	+	○	○	..	....	....	○	Pc2	R_2 a_1 L_1 a_1
F., 35	Catarrhal	D	Quiescent	I	R	28	Favor.	Unimpaired	154¼	...	60–80	98.2	..	○	..	Unli	mited	....	...	R-stat. L-sli.	clear.
6293 A	School-teacher, S.	A	R. Far Adv. B.	II	R_1 L_1	48	Favor.	Impaired	114	143	76–100	99.6	+	+	+	..	....	....	..	Pc3	R_1 b_1 L_3 c_2
F., 38	Catarrhal	D	Unimproved	III	R_2 L_1	53½	Favor.	Unimpaired	115	...	80-96	98.8	..	+	..	..	....	....	...	R. & L-stat.	
6293	Teacher, S.	A	P.R. Mod. Adv. A.	II	R_3 L_1	10	Favor.	Unimpaired	141¾	144	68–96	98.8	+	+	+	..	....	....	2+	Pc3	R_3 b_1 L_1 a_1
F., 34	Catarrhal	D	Quiescent	II	R_3	16	Favor.	Unimpaired	146½	...	64–78	98.8	..	○	..	45	....	....	...	R. ? clear. L s	li. clear.
	Post-grippe																				
6294	Pantry Worker, M	A	P.R. Mod. Adv. A.	I	R_1 L_1	5	Favor.	Impaired	145	147	60–98	98.0	–	–	○	..	Neurasthenia	....	○	Pc3	R_3 b_1 L_2 a_0
F., 50	Pleuritic	D	Quiescent	I	R	9	Favor.	Unimpaired	156¾	...	78–84	97.9	..	–	..	Un-	Neurasthenia	....	...	Not taken	
																limit	ed				
6295	Dentist, S.	A	P.R. Minimal A.	I	R_1	9	Favor.	Unimpaired	150¼	150	66–100	98.5	+	+	○	..	....	....	○	Pc1	R_1 a_0
M., 24	Catarrhal	D	Quiescent	I	R	15	Favor.	Unimpaired	152¼	...	72–78	98.3	..	○	..	Unli	mited	....	...	R. ? clear. L-	stat.
6296	Accountant, M.	A	R. Mod. Adv. A.	I	R_1	6	Favor.	Unimpaired	161¾	184	64–92	98.5	+	+	○	..	....	....	1+	Pc3	R_3 b_1 L_2 b_1
M., 42½	Catarrhal	D	Ap. Arrested	...	....	9¾	Favor.	Unimpaired	166¾	...	70–80	98.0	..	○	..	Unli	mited	....	...	R. & L-clear.	
6297	Accountant, S.	A	R. Mod. Adv. A.	...	....	7	Favor.	Impaired	106¼	141¼	74–92	99.0	+	○	○	..	Uterine fibroids	....	○	Pc3	R_1 a_0 L_2 b_1
F., 39	Catarrhal	D	Ap. Arrested	...	....	14	Favor.	Unimpaired	112¼	...	68–78	98.1	..	○	..	Unli	mited	....	...	R. & L-stat.	
6298	Maid, S.	A	Non-Tbc.	...	....	24	Favor.	Unimpaired	115¾	128½	68–92	98.8	?	○	○	..	....	....	○	Pt1	R_1 a_0
F., 42	Catarrhal	D	Non-Tbc.	...	....	28	Favor.	Unimpaired	121¼	...	68–80	98.5	..	○	..	Unli	mited	O. T. 2/5	...	R. & L-stat.	
6299	Milliner Designer,	A	P.R. Minimal A.	I	R_1	15	Favor.	Unimpaired	124	136¼	64–96	98.5	○	+	+	..	....	....	○	Pc2	R_1 b_1 L_1 a_0
F., 21	Hemoptoic	D	Ap. Arrested	...	....	21	Favor.	Unimpaired	131¾	...	70–80	98.0	..	○	..	Unli	mited	....	...	R. sli. clear.	L-stat.

6300 M., 27	Clerk, M. Pleuritic	A D	P.R. Mod. Adv. A. Quiescent	II II	$R_2 L_1$ $R_2 L_1$	72 74¾	Favor. Favor.	Unimpaired Unimpaired	153 157½	151½ ...	56–84 54–78	98.4 98.5	+ ..	○ ○	○ ..	.. 60	....	....	○ ...	Pc3 R. & L-stat.	$R_3 b_1 L_1 a_0$
6301 M., 24½	Accountant, S. Catarrhal	A D	P.R. Mod. Adv. A. Quiescent	I II	$R_0 L_2$ L_2	7 12¾	Favor. Favor.	Unimpaired Unimpaired	189¼ 195¾	168½ ...	56–76 62–74	98.6 98.2	– ..	+ ○	○ ..	.. Unlimited	....	....	○ ...	Pc3 R-stat. L-clear.	$R_2 a_1 L_3 b_1$
6302 M., 23	Physician, S. Insidious	A D	P.R. Mod. Adv. A. Improved	II II	$R_1 L_1$ $R_1 L_1$	8 16	Favor. Favor.	Unimpaired Unimpaired	149½ 138	164 ...	80–96 72–94	98.6 98.4	+ ..	+ +	+ ..	.. ..	....	....	4+ ...	Pc3 R-clear. inc. & contraction cavity L-clear.	$R_2 b_2 L_1 a_1$
6303 M., 33	Furniture-sales, M. Insidious	A D	C. Far Adv. A. Quiescent	... ...	....	8 10½	Favor. Favor.	Unimpaired Unimpaired	165 160¾	168½ ...	64–90 66–86	98.3 98.5	– ..	○ ○	○ ..	.. Unlimited	Colitis (Tbc.) Colitis (Tbc.)	.... Ultra-violet ray	4+ ...	Pc2 R. & L-stat.	$R_1 a_1 L_2 b_1$
6304 M., 26	Physician, S. Hemoptoic	A D	P.R. Minimal A. Quiescent	I I	L_1 L	6 8¾	Favor. Favor.	Unimpaired Unimpaired	175 178¼	153½ ...	56–84 60–78	98.4 98.3	+ ..	○ ○	○ ..	.. 60	....	....	3+ ...	Pc1 R-stat. L-clear.	$L_1 b_1$
6305 M., 23	Student, S. Insidious	A D	C. Far Adv. A. Quiescent	II II	R_3 R_3	24 36	Favor. Favor.	Unimpaired Unimpaired	145 140¼	143 ...	56–88 60–72	98.6 98.0	+ ..	○ +	+ ..	.. Unlimited	Colitis (Tbc.) Colitis (Tbc.)	.... Ultra-violet ray	4+ ...	Pc3 R. & L-clear.	$R_3 b_2 L_2 a_1$
6306 M., 19	Reporter, S. Pleuritic	A D	Suspected Tbc. Suspected Tbc.	... ...	....	2 4¼	Favor. Favor.	Unimpaired Unimpaired	122½ 124½	135 ...	60–104 70–96	98.4 98.0	– ..	○ ○	○ ..	.. Unlimited	....	....	4+ ...	Pc2? R. & L-stat.	$R_2? a_0$
6307 M., 43	Civil Engineer, S. Insidious	A D	P.R. Minimal A. Quiescent	I I	L_1 $R_1 L_1$	4 9¾	Favor. Favor.	Unimpaired Unimpaired	139 141¾	169 ...	60–80 60–72	98.3 98.5	– ..	– ○	○ ..	.. 30	....	....	... ...	Pc1 R. & L-stat.	$L_1 b_1$
6308 F., 23	Stenographer, M. Catarrhal	A D	P.R. Mod. Adv. A. Quiescent	I I	R_3 R	10 16	Favor. Favor.	Unimpaired Unimpaired	120¾ 117¾	114 ...	76–104 66–74	98.7 98.2	+ ..	○ ○	+ ..	.. Unlimited	....	....	4+ ...	Pc2 R-clear. L-stat.	$R_2 b_2$
6309 M., 28	Physician, M. Catarrhal	A D	R. Mod. Adv. A. Ap. Arrested	... ...	....	8 12¼	Favor. Favor.	Unimpaired Unimpaired	174¾ 185½	164 ...	68–104 96–96	98.4 98.4	+ ..	○ ○	○ ..	.. 45	.... Pleurisy	....	2+ ...	Pc2 R-stat. L-clear. of & inc. pleurisy	$L_2 b_1$
6310 F., 40	Registered Nurse, S Catarrhal	A D	R. Mod. Adv. A. Quiescent	... I	 L	60 66½	Favor. Favor.	Unimpaired Unimpaired	170½ 177¼	154 ...	54–94 84–88	98.2 98.7	+ ..	+ +	+ ..	.. 60	....	.... Ultra-violet ray	○ ...	Pc3 R. & L-clear.	$R_2 b_1 L_3 b_2$
6311 M., 40	Physician, M. Catarrhal	A D	R. Mod. Adv. A. Ap. Arrested	... ...	....	7 12¾	Favor. Favor.	Unimpaired Unimpaired	134 144	169½ ...	68–88 66–82	98.5 98.5	– ..	○ –	– ..	.. Unlimited	....	....	○ ...	Pc2 R. & L-clear.	$R_1 b_1 L_1 a_1$
6312 A F., 19	Student, S. Insidious	A D	P.R. Mod. Adv. A. Unimproved	II II	$R_2 L_0$ $R_1 L_1$	60¼ 68¾	Unfavor. Unfavor.	Unimpaired Unimpaired	102 105	113 ...	84–102 86–102	98.5 98.4	+ ..	+ +	+ ..	.. ..	....	.... Ultra-violet ray	... ...	Pc3 R. & L-inc.	$R_2 b_2 L_1 a_1$
6312 M., 22	Dental Student, S. Catarrhal	A D	P.R. Mod. Adv. A. Unimproved	II II	R_3 R_3	4 9¾	Favor. Favor.	Unimpaired Unimpaired	153 153	158 ...	68–104 84–104	98.2 98.6	+ ..	○ ○	○ ..	.. ..	....	....	○ ...	Pc3 Not taken	$R_3 b_2 L_1 a_1$
6313 F., 23	Stenographer, S. Catarrhal	A D	Non-Tbc. Non-Tbc.	... ...	....	4 5¾	Favor. Favor.	Unimpaired Unimpaired	97½ 98	116½ ...	72–96 76–88	98.5 98.5	○ ..	○ –	– ..	.. Unlimited	....	.... O. T. 1/1 neg.	○ ...	Questionable R. & L-stat.	

R̦ = Patients having intensive rest treatment during first six weeks of residence.

No. Sex Age	Occupation Marital condition Onset		Condition	Extent of physical signs (Turban)		Duration of disease, months	General condition	Digestion	Weight		Range of pulse 7 days on admission 2 days on discharge	Av. max. temp. 7 days on admission 2 days on discharge	T. B.			Exercise in minutes	Complications	Tuberculin O. T. maximum dose or other treatment	Complement fixation	X-ray findings	
				Both lungs	Each lung				Actual	Standard			Previous	Admission—Discharge.	Residence					Both lungs	Each lung
6314 M., 23	College Student, S. Catarrhal	A D	P.R. Mod. Adv. A. Quiescent	I I	L_2 L	12 19⅓	Favor. Favor.	Unimpaired Unimpaired	132¼ 126	150 ...	66-100 68-81	98.6 98.6	+ ..	+ ○	+ ..	.. Unli	.... mited	....	○ ...	Pc3 R-inc. & inc.	$R_2\ a_1\ L_3\ b_2$ pleurisy L-clear.
6315 F., 28	College Instr., S. Insidious	A D	R. Mod. Adv. A. Ap. Arrested	... ...	....	4 7	Favor. Favor.	Unimpaired Unimpaired	132½ 127¾	135 ...	64-92 70 80	97.8 98.7	.. ..	– –	– ..	.. 45	....	....	2+ ...	Pc2 R-stat. L-cle	$L_2\ a_1$ ar.
6316 M., 36	Salesman, M Insidious	A D	R. Mod. Adv. A. Ap. Arrested	... ...	....	16 21	Favor. Favor.	Unimpaired Unimpaired	134¼ 145	161 ...	54-80 58-66	98.1 98.2	+ ..	+ ○	+ ..	.. Unli	.... mited	....	○ ...	Pc3 R. & L-clear.	$R_2\ a_1\ L_3\ b_1$
6317 F., 30	Registered Nurse, S Catarrhal	A D	P.R. Far Adv. A. Unimproved	III III	$R_2\ L_2$ $R_2\ L_2$	5 11½	Unfavor. Unfavor.	Unimpaired Unimpaired	147¾ 145	138 ...	68-92 84-102	99.4 99.9	○ ..	+ +	+ ..	.. ..	....	.... Ultra-violet ray	4+ ...	Pc3 R. def. clear. at base L-s	$R_3\ c_2\ L_2\ b_1$ inc. cavity? inc. tat.
6319 F., 43	Public Accountant, S, Insidious	A D	R. Minimal A. Ap. Arrested	... ...	....	132 138	Favor. Favor.	Unimpaired Unimpaired	135½ 133¼	140 ...	64-96 54-96	98.4 98.5	+ ..	○ ○	○ ..	.. 60	....	.... Ultra-violet ray	4+ ...	Pc1 R-stat. L.? cl	$L_1\ b_1$ ear.
6320 F., 26	Advertiser, S. Catarrhal	A D	P.R. Mod. Adv. A. Quiescent	II I	$R_1\ L_1$ R L	60 66	Favor. Favor.	Unimpaired Unimpaired	120 124¾	132¼ ...	64-88 64-72	98.3 98.4	+ ..	○ ○	○ .. li	.. Un- mited	Albuminuria Albuminuria	....	○ ...	Pc3 R. ? clear. L-	$R_3\ b_1\ L_3\ b_1$ stat.
6321 A M., 27	Wire Inspector, S. Catarrhal-Pleuritic	A D	R. Mod. Adv. A. Quiescent	... I	.... R_1	39 59¼	Favor. Favor.	Unimpaired Unimpaired	123½ 120½	134 ...	66-87 50-76	98.4 97.9	? ..	○ –	○ ..	.. Unli	.... mited	....	... ...	Pc3 R-clear. L-st	$R_3\ b_1\ L_1\ a_0$ at.
6321 F., 28	School-teacher, S. Pleuritic	A D	P.R. Mod. Adv. A. Quiescent	II I	$R_2\ L_2$ $R_1\ L_1$	52 58	Favor. Favor.	Unimpaired Unimpaired	128 133¾	143¼ ...	64-88 64-88	98.5 98.9	○ ..	+ +	+ ..	.. 60	....	....	4+ ...	Pc3 R. & L-clear.	$R_3\ b_1\ L_3\ b_2$
6322 A F., 20	Nurse in Training, S Insidious	A D	C. Far Adv. A. Ap. Arrested	... ...	....	21 38	Favor. Favor.	Unimpaired Unimpaired	161 146	143 ...	78-84 80-88	98.0 98.2	+ ..	– –	– .. li	.. Un- mited	Colitis (Tbc.) Colitis (Tbc.)	....	... ...	Pc2 R. more fibro	$R_2\ b_1$ sis, L-stat.
6322 M., 20	Medical Student, S Insidious	A D	P.R. Mod. Adv. A. Unimproved	I II	R_2 $R_1\ L_1$	54 58¼	Unfavor. Unfavor.	Impaired Impaired	164 156	163½ ...	76-104 78-96	98.8 98.8	– ..	+ +	+ ..	.. ..	Colitis (Tbc.)? Colitis (Tbc.)	.... Ultra-violet ray	4+ ...	Pc3 R-clear & inc	$R_3\ c_2$. L-inc.
6323 A M., 28	Medical Student, S Catarrhal	A D	R. Mod. Adv. A. Quiescent	... ...	....	13 20½	Favor. Favor.	Unimpaired Unimpaired	154¼ 154¼	182 ...	70-80 68-78	98.6 98.2	+ ..	○ –	– ..	.. Unli	.... mited	....	... ...	Pc2 R-stat. L-cle	$L_2\ b_2$ ar.
6323 F., 31	Stenographer, S Febrile	A D	P.R. Mod. Adv. A. Quiescent	I I	L_1 L_2	5 11	Favor. Favor.	Unimpaired Unimpaired	114 118¼	140¼ ...	68-110 70-84	98.7 98.7	– ..	-- ○	○ ..	.. Unli	.... mited	....	4+ ...	Pc3 R. ? clear. L-	$R_1\ a_1\ L_2\ b_1$ clear.

6324 A M., 20	Salesman, S Insidious	A D	P.R. Far. Adv. A. Quiescent	III III	R_3 L_2 R_2 L_2	20 26¼	Favor. Favor.	Unimpaired Unimpaired	136½ 136¼	145 ...	64–82 70–90	98.6 98.3	○ ..	+ +	− ..	.. Unli	.... mited	....	... ...	Pc3 R-inc. A. S.	R_3 b_2 L_3 b_2 L-clear.
6324 F., 48	Nurse, M Hemoptoic	A D	Suspected Tbc. Suspected Tbc.	... ...	....	5 6¾	Favor. Favor.	Impaired Unimpaired	212¾ 215	156 ...	48–100	98.0 98.8	○ ..	○ ○	○ ..	.. Unli	.... mited	.... O. T. 1/1 neg.	○ ...	Non-tubercu R. & L-stat.	lous
6325 A M., 25	Medical Student, S Pleuritic	A D	R. Mod. Adv. A. Ap. Arrested	... ...	....	130 135	Favor. Favor.	Unimpaired Unimpaired	151¼ 141¼	166 ...	74–88 70–82	98.5 98.6	+ ..	○ ○	− ..	.. 45	....	....	... ...	Pc3 R. & L-stat.	R_2 b_1 L_3 b_1
6325 F., 34	Housewife, M Catarrhal	A D	P.R. Mod. Adv. A. Quiescent	II I	R_1 L_1 R_1 L_1	30 38¼	Favor. Favor.	Unimpaired Unimpaired	167½ 165	148 ...	84–100 80–86	98.8 98.5	+ ..	− ○	○ ..	.. Unli	.... mited	....	3+ ...	Pc3 R-stat. L-cle	R_2 a_0 L_3 b_1 ar.
6326 A M., 24	Medical Student, S Catarrhal	A D	R. Mod. Adv. A. Ap. Arrested	I? I	$R?_1$ R_1	22½ 30	Favor. Favor.	Unimpaired Unimpaired	220 219½	174½ ...	62–84 56–86	98.5 98.1	+ ..	○ ○	− ..	.. 60	....	....	... ...	Pc3 R. & L-clear.	R_2 b_2 L_2 a_0
6326 F., 31	Social Worker, S Catarrhal	A D	P.R. Mod. Adv. A. Quiescent	II I	L_2 L_2	7 13	Favor. Favor.	Unimpaired Unimapired	121¾ 123¾	136 ...	68–88 74–100	99.0 98.8	− ..	− −	○ ..	.. Unli	.... mited	....	○ ...	Pc3 R. & L-clear.	R_2 b_1 L_3 b_2
6327 A M., 26	Electrician, S Insidious	A D	P.R. Mod. Adv. A. Unimproved	I II	R_2 L_0 R pneumothorax L_0	15 17⅓	Favor. Favor.	Unimpaired Unimpaired	168 159	174 ...	58–70 60–76	98.3 98.9	+ ..	○ −	− ..	.. ..	....	.... Pneumothorax	... ...	Pc3 R pneumoth	R_3 b_1 orax, L-stat.
6327 M., 42	Surgeon, M Pleuritic	A D	R. Mod. Adv. A. Ap. Arrested	... ...	....	8 10¾	Favor. Favor.	Unimpaired Unimpaired	143¼ 142	165 ...	76–92 74–86	98.4 98.7	− ..	○ −	○ ..	.. 60	....	....	4+ ...	Pc1 R. & L-clear.	R_1 b_1 L_1 a_1
6328 A F., 28	Clerk, S Insidious	A D	P.R. Mod. Adv. A. Quiescent	II I	R_1 L_2 L_1	59½ 67½	Favor. Favor.	Unimpaired Unimpaired	166 158½	131¼ ...	70–90 76–100	98.5 98.7	− ..	− −	− ..	.. 60	....	....	... ...	Pc3 R-clear. L-cl	R_1 a_1 L_3 b_1 ear.?
6328 F., 21	Housewife, M Catarrhal	A D	P.R. Mod. Adv. A. Improved	II II	R_2 L_2 R_2 L_2	48 54	Favor. Favor.	Impaired Unimpaired	106¾ 113½	128¼ ...	60–128 68–96	98.8 99.0	+ ..	○ ○	○ ..	.. ..	....	.... Ultra-violet ray	4+ ...	Pc3 R. & L-clear.	R_2 b_1 L_3 b_1
6329 A F., 30	Housewife, M Insidious	A D	P.R. Mod. Adv. A. Quiescent	I II	R_2 L_2 R_2 L_2	39 45¼	Favor. Favor.	Unimpaired Unimpaired	123¼ 125½	132 ...	78–88 78–94	98.4 98.4	○ ..	− ○	− ..	.. 60	....	....	... ...	Pc3 R. & L-clear.	R_3 b_1 L_3 b_1
6329 M., 51	Ivory Carver, M Catarrhal	A D	R. Far Adv. B. Dead	I II	L_1 R_1 L_1	9 13¼	Unfavor.	Unimpaired	167½ 156	? ...	80–112 100–120	99.6 98.9	+ ..	+ +	+ ..	.. ..	.... Colitis (Tbc.)	.... Ultra-violet ray	4+ ...	Pc3 R-stat. L-inc	R_2 a_1 L_3 c_2 .
6330 A M., 32	Accountant, M Insidious	A D	P.R. Mod. Adv. A. Unimproved	I I	L_2 L_2	39½ 40½	Favor. Favor.	Unimpaired Unimpaired	133 139¾	158¾ ...	68–104 62–90	99.2 98.4	+ ..	+ −	− ..	.. Unli	.... mited	....	... ...	Pc3	R_3 b_2 L_1 b_2 Not done
6330 M., 25	Clerk, S Hemoptoic	A D	P.R. Mod. Adv. A. Quiescent	II I	R_2 R	4 10	Favor. Favor.	Unimpaired Unimpaired	147¾ 147½	159½ ...	60–78 64–80	98.3 98.5	+ ..	+ +	+ ..	.. Unli	.... mited	....	4+ ...	Pc3 R-clear & de ows (2) L-c	R_3 b_2 L_2 b_1 v. annular shad- lear.
6331 A F., 25	Registered Nurse, S Insidious	A D	P.R. Mod. Adv. A. Quiescent	II II	R_1 L_2 R_1 L_2	53½ 58½	Favor. Favor.	Unimpaired Unimpaired	142½ 138½	135 ...	76–90 70–90	98.5 98.7	+ ..	○ ○	○ ..	.. Unli	.... mited	....	... ...	Pc3 R. & L-stat.	R_1 a_0 L_3 $c?_2$

R = Patients having intensive rest treatment during first six weeks of residence.

No. Sex Age	Occupation Marital condition Onset		Condition	Extent of physical signs (Turban)		Duration of disease, months	General condition	Digestion	Weight		Range of pulse 7 days on admission 2 days on discharge	Av. max. temp. 7 days on admission 2 days on discharge	T. B.			Exercise in minutes	Complications	Tuberculin O. T. maximum dose or other treatment	Complement fixation	*X*-ray findings	
				Both lungs	Each lung				Actual	Standard			Previous	Admission—Discharge	Residence					Both lungs	Each lung
6331 M., 31	Clerk, M Catarrhal	A D	R. Mod. Adv. A. Quiescent	. . . I	. . . . R_1 L_1	4 $15\frac{1}{2}$	Favor. Favor.	Unimpaired Unimpaired	135 $154\frac{1}{2}$	167 . . .	72–96 78–82	98.2 98.7	+ . .	+ ○	+ . .	. . Unli	.... mited	....	4+ . . .	Pc3 R. & L-stat.	R_2 a_1 L_2 b_1
6332 A M., 21	Adv. Clerk, S Insidious	A D	P.R. Mod. Adv. A. Quiescent	I I	R_1 R_1	32 $33\frac{1}{2}$	Favor. Favor.	Unimpaired Unimpaired	$142\frac{1}{2}$ $139\frac{1}{2}$	$156\frac{1}{4}$ . . .	62–84 68–90	98.3 98.4	+ . .	○ ○	− . .	. . Unli	.... mited	....	. . . . . .	Pc3 Not taken	R_3 b_1 L_2 a_1
6332 M., 23	Bank Clerk, M Hemoptoic	A D	P.R. Minimal A. Quiescent	I I	L_1 L	8 12	Favor. Favor.	Unimpaired Unimpaired	$170\frac{3}{4}$ $177\frac{3}{4}$	$152\frac{3}{4}$ . . .	60–88 66–72	97.8 98.3	+ . .	○ ○	○ . .	. . Unli	.... mited	....	○ . . .	Pc1 R. & L-stat.	L_1 b_1
6333 A M., 22	Clothing Sales, S Insidious	A D	P.R. Mod. Adv. A. Quiescent	I I	R_1 R_1	21 $26\frac{1}{2}$	Favor. Favor.	Unimpaired Unimpaired	$179\frac{3}{4}$ $167\frac{1}{2}$	149 . . .	60–90 60–90	98.6 98.6	+ . .	○ +	− . .	. . Unli	.... mited	....	. . . . . .	Pc3 R. & L-clear.	R_3 a_1 L_1? a_0
6333 M., 33	Lunchman, S Insidious	A D	P.R. Mod. Adv. A. Unimproved	II I	R_1 L_2 R	16 $27\frac{1}{3}$	Favor. Unfavor.	Unimpaired Unimpaired	139 132	154 . . .	64–100 80–98	99.3 99.5	+ . .	+ +	+ . .	. . . .	....	.... Ultra-violet ray	○ . . .	Pc3 R. & L-inc.	R_2 b_1 L_3 $c?_2$
6334 A M., 27	Mech. Engineer, S Hemoptoic	A D	P.R. Mod. Adv. A. Quiescent	II II	R_1 L_2 R_1 L_1	42 48	Favor. Favor.	Unimpaired Unimpaired	143 $151\frac{1}{4}$	144 . . .	64–76 62–74	98.0 98.4	+ . .	○ ○	○ . .	. . Un- limited	Epididymitis Epididymitis	....	. . . . . .	Pc3 R. & L-clear.	R_3 b_1 L_2 b_1
6334 M., 35	Clerk, S Insidious	A D	P.R. Mod. Adv. A. Quiescent	II II	R_1 L_2 R_1 L_2	8 $14\frac{1}{4}$	Favor. Favor.	Unimpaired Unimpaired	$156\frac{1}{4}$ $166\frac{1}{2}$	$166\frac{1}{4}$ . . .	60–80 62–72	98.1 98.2	+ . .	+ ○	+ . .	. . Unli	.... mited	....	4+ . . .	Pc3 R. & L-clear.	R_3 b_1 L_2 b_1
6335 A M., 26	Physician, S Catarrhal & flu.	A D	R. Mod. Adv. A. Ap. Arrested	. . . . . .	. . . .	11 14	Favor. Favor.	Unimpaired Unimpaired	$180\frac{1}{2}$ $176\frac{3}{4}$	181 . . .	66–84 68–92	98.6 100.0	+ . .	○ ○	− . .	. . Unli	.... mited	....	. . . . . .	Pc3 R. & L-stat.	R_2 a_1 L_2 a_1
6335 F., 29	Registered Nurse, M, Catarrhal	A D	P.R. Mod. Adv. A. Unimproved	II I	R_2 R	5 13	Unfavor. Unfavor.	Unimpaired Unimpaired	$111\frac{1}{2}$ 120	129 . . .	60–92 88–92	98.3 99.1	− . .	+ +	+ . .	. . . .	....	.... Ultra-violet ray	4+ . . .	Pc3 R-clear. L-inc.	R_3 c_2
6336 A F., 27	Nurse in Training, S Pleuritic c effusion	A D	P.R. Mod. Adv. A. Quiescent	II . . .	R_2 L_2	39 $41\frac{1}{4}$	Favor. Favor.	Unimpaired Unimpaired	$147\frac{1}{2}$ $139\frac{1}{2}$	141 . . .	70–96 72–88	98.5 98.0	− . .	− −	− . .	. . Unli	.... mited	....	. . . . . .	Pc3 Not taken	R_2 b_1 L_2 b_1
6336 F., 31	Model, S Catarrhal	A D	R. Mod. Adv. A. Unimproved	I I	R_1 R_1	7 $8\frac{1}{4}$	Favor. Favor.	Unimpaired Unimpaired	$162\frac{1}{4}$ $160\frac{3}{4}$	144 . . .	72–112 72–90	99.2 98.8	+ . .	+ . .	. . . .	. . 15	....	....	○ . . .	Pc2 R. & L-clear.	R_1 b_1 L_1 b_2
6337 A F., 28	Ins. Cler, S Catarrhal	A D	P.R. Mod. Adv. A. Quiescent	I I	R_2 R_2	20 $22\frac{1}{2}$	Favor. Favor.	Unimpaired Unimpaired	121 $118\frac{3}{4}$	$132\frac{1}{4}$ . . .	80–88 76–88	98.4 98.4	+ . .	○ −	− . .	. . Unli	.... mited	....	. . . . . .	Pc3 R. ? clear. & L-stat.	R_3 b_1 dev. pleurisy

6337	Housewife, M	A	C. Far Adv. A.	I	R_1 L_1	9	Favor.	Impaired	121	$123\frac{3}{4}$	64–84	98.0	–	–	○	..	Colitis (Tbc.)	....	2+	Pc3	$R_2\,a_1\,L_1\,a_1$
F., 29	Catarrhal	D	Quiescent	I	R_1 L_1	$20\frac{1}{2}$	Favor.	Unimpaired	$145\frac{1}{4}$	...	67–79	98.3	..	○	.. li	Un- mited	Colitis (Tbc.)	Ultra-violet ray	...	R. & L-clear.	
6338 A	Diamond Polisher,	A	C.R. Far Adv. A.	II	R_2 L_2	11	Favor.	Unimpaired	$135\frac{3}{4}$	$119\frac{1}{2}$	70–86	98.5	–	–	○	..	Colitis (Tbc.)	....	...	Pc3	$R_3\,b_1\,L_2\,b_2$
F., 23	S, catarrhal	D	Quiescent	III	R_3 L_2	$23\frac{1}{2}$	Favor.	Unimpaired	$131\frac{3}{4}$	...	82–102	98.5	..	+	..	60	....	Ultra-violet ray	...	R-clear. L-in	c. & clear.
6338	Housekeeper, S	A	R. Mod. Adv. A.	...	....	12	Favor.	Unimpaired	102	$117\frac{1}{4}$	68–100	98.8	○	○	○	..	....	....	○	Pc2	$R_2\,a_1\,L_1\,a_1$
F., 19	Insidious	D	Ap. Arrested	...	....	23	Favor.	Unimpaired	111	...	74–84	98.8	..	○	..	Unli	mited	....	...	R. & L-stat.	
6339 A	Teacher, S	A	R. Mod. Adv. A.	I	L_1	42	Favor.	Unimpaired	113	140	78–90	98.8	+	+	○	..	....	....	...	Pc3	$R_2\,a_0\,L_3\,b_1$
F., 23	Catarrhal	D	Ap. Arrested	...	....	$53\frac{1}{2}$	Favor.	Unimpaired	115	...	66–84	98.7	..	○	..	Unli	mited	....	...	R. & L-clear.	
6339	Accountant, S	A	P.R. Mod. Adv. A.	II	R_3	6	Favor.	Unimpaired	$153\frac{1}{2}$	$165\frac{1}{2}$	64–108	98.6	+	○	○	..	....	....	4+	Pc3	$R_3\,b_1\,L_3\,b_1$
M., 22	Catarrhal	D	Quiescent	II	R_2 $L?_1$	$12\frac{1}{2}$	Favor.	Unimpaired	$160\frac{1}{2}$	...	70–79	98.5	..	–	..	Unli	mited	....	...	R. & L-clear.	
6340 A	Medical Student, S	A	P.R. Mod. Adv. A.	I	R_1	30	Favor.	Unimpaired	$144\frac{3}{4}$	142	58–78	98.6	+	○	–	..	....	....	...	Pc3	$R_3\,b_1\,L_3\,a_1$
M , 25	Pleuritic	D	Quiescent	I	R_1	$34\frac{1}{4}$	Favor.	Unimpaired	$141\frac{3}{4}$	...	56–78	98.2	..	○	..	Unli	mited	....	...	R. ? clear. ca stat.	v. now def. L-
6340	Housewife, M	A	Non-Tbc.	...	....	18	Favor.	Unimpaired	$109\frac{3}{4}$	$123\frac{1}{2}$	70–88	98.6	–	○	○	..	....	....	○	Pt3	$R_3\,a_0$
F., 27	Insidious, Post-flu.	D	Non-Tbc.	...	....	19	Favor.	Unimpaired	$110\frac{1}{4}$	...	72–79	99.0	..	○	..	60	....	O. T. 2/1	...	R. & L-stat.	
6341 A	Pharmacist, S	A	R. Mod. Adv. A.	...	....	10	Favor.	Unimpaired	132	129	60–78	98.2	?	–	–	..	Psoas abscess sinu	s	...	Pc3	$R_2\,b_1\,L_1\,b_1$
M., 20	Psoas Abscess	D	Ap. Arrested	...	....	$15\frac{1}{2}$	Favor.	Unimpaired	$131\frac{1}{4}$	...	60–80	98.3	..	–	.. li	Un- mited	Psoas abscess sinus	Ultra-violet ray	...	R. & L-clear.	
6341	Bookkeeper, S	A	P.R. Mod. Adv. A.	I	R_1 L_1	4	Favor.	Unimpaired	145	$121\frac{3}{4}$	64–80	98.1	+	+	○	..	....	....	○	Pc3	$L_3\,b_2$
F., 19	Catarrhal	D	Quiescent	I	L	$14\frac{1}{4}$	Favor.	Unimpaired	142	...	72–84	98.6	..	–	..	Unli	mited	....	...	R-stat. L-cle	ar. inc. haziness
6342 A	Sales Manager, M	A	R. Mod. Adv. A.	...	....	180	Favor.	Unimpaired	$114\frac{1}{4}$	$161\frac{1}{2}$	64–92	98.6	–	○	○	..	Wassermann 4+	Salvarsan	4+	Pc2	$R_1\,b_1\,L_1\,b_2$
M., 33	Pleuritic c Effusion	D	Quiescent	...	....	$190\frac{1}{2}$	Favor.	Unimpaired	$124\frac{1}{4}$	...	60–82	98.8	..	○	..	45	Colitis (Tbc.)	Ultra-violet ray	...	R. & L-clear.	
6342	Registered Nurse, S	A	R. Far Adv. A.	II	L_2	6	Favor.	Unimpaired	$115\frac{3}{4}$	$122\frac{3}{4}$	78–104	98.5	–	+	+	..	....	Attempted pneu- mothorax	○	Pc3	$R_2\,a_1\,L_2\,c_2$
F., 27	Hemoptoic	D	Unimproved	II	L_2	$12\frac{1}{2}$	Favor.	Unimpaired	109	...	92–112	101.6	..	+	..	..	Colitis (Tbc.)	Ultra-violet ray	...	R. & L-clear.	& inc.
6343	Jeweler, M.	A	P.R. Mod. Adv. A.	II	L_2	12	Unfavor.	Unimpaired	$154\frac{3}{4}$	$171\frac{1}{2}$	64–80	98.5	+	+	+	..	....	....	○	Pc3	$R_2\,a_1\,L_3\,b_2$
M., 35	Catarrhal	D	Unimproved	II	L_2	23	Unfavor.	Unimpaired	$154\frac{3}{4}$	...	64–90	98.3	..	+	..	..	Hysterical paral- ysis ? pleurisy	Ultra-violet ray	...	R-stat. L-ple	urisy inc.
6344 B	Registered Nurse, S	A	Non-Tbc.	...	....	8	Favor.	Unimpaired	113	121	84–114	99.5	–	–	–	..	Ulcerative colitis (Non-Tbc.)	....	○	Pt1	$R_1\,a_0$
F., 23	Catarrhal	D	Non-Tbc.	...	....	$8\frac{3}{4}$	Favor.	Unimpaired	$112\frac{1}{2}$	...	92–112	99.6	..	–	..	..	Ulcerative colitis (Non-Tbc.)	Ultra-violet ray	...	......	Not taken
6344	Bookkeeper, S	A	Bacilli Minimal A	...	....	72	Favor.	Unimpaired	$117\frac{3}{4}$	$129\frac{1}{2}$	66–88	98.2	○	○	+	..	....	....	○	Pleurisy	
F., 25	Insidious, Post-flu.	D	Ap. Arrested	...	....	78	Favor.	Unimpaired	121	...	68 82	98.4	..	○	..	Unli	mited	O. T. 2/5		R-stat. L-?	dev.

R = Patients having intensive rest treatment during first six weeks of residence.

No. Sex Age	Occupation Marital condition Onset		Condition	Extent of physical signs (Turban)		Duration of disease, months	General condition	Digestion	Weight		Range of pulse 7 days on admission 2 days on discharge	Av. max. temp. 7 days on admission 2 days on discharge	T. B.			Exercise in minutes	Complications	Tuberculin O. T. maximum dose or other treatment	Complement fixation	X-ray findings	
				Both lungs	Each lung				Actual	Standard			Previous	Admission—Discharge.	Residence					Both lungs	Each lung
6345	Telegrapher, S	A	P.R. Mod. Adv. A.	III	$R_1 L_2$	132	Favor.	Unimpaired	134	130	60–84	98.3	+	○	+	..	....	....	4+	Pc3	$R_2 a_0 L_3 b_1$
F., 34	Pleuritic	D	Quiescent	II	L_2	138	Favor.	Unimpaired	129½	...	68–84	98.0	..	○	..	Unlimited	......	....	...	R: & L-clear.	
6346	Carpet Cleaner, S	A	R. Mod. Adv. A.	...	....	5	Favor.	Unimpaired	155¾	149	56–86	98.9	+	○	○	..	Colitis (Tbc.)	....	○	Pc3	$R_1 b_1 L_3 b_2$
M., 25	Insidious	D	Ap. Arrested	...	....	15¼	Favor.	Unimpaired	164	...	60–72	98.6	..	○	..	Unlimited	......	Ultra-violet ray	...	R. & L-clear.	
6347	Clerk, S	A	R. Mod. Adv. A.	...	....	8	Favor.	Unimpaired	155¼	179	64–92	98.1	+	○	+	..	Mitral regurg.	....	○	Pc2	$R_2 b_1$
M., 25	Insidious	D	Ap. Arrested	...	....	16¾	Favor.	Unimpaired	156	...	66–84	98.5	..	○	..	Unlimited	Mitral regurg.	....	...	R-clear. L-stat.	
6348	Baker, S	A	P. Far Adv. B.	III	$R_3 L_2$	5	Favor.	Unimpaired	157	164½	74–108	100.4	+	+	+	..	....	....	○	Pc3	$R_1 a_1 L_3 b_2$
M., 25	Catarrhal	D	Unimproved	III	$R_3 L_2$	8½	Favor.	Unimpaired	157¼	...	78–88	98.5	..	+	..	..	....	....	...	R-inc. L-clear. & inc.	
6349	Teacher, M	A	P.R. Mod. Adv. A.	II	L_2	6	Favor.	Unimpaired	190¼	182	64–88	98.7	○	○	+	..	....	....	○	Pc2	$L_2 b_1$
M., 35	Catarrhal	D	Unimproved	II	L_2	14	Favor.	Unimpaired	185	...	70–82	98.3	..	○	..	..	....	....	...	R.stat. L-clear. A. S.	? inc. dev.
6351	Merchant, M	A	R. Far Adv. A.	III	$R_3 L_0$	15	Favor.	Impaired	147	160½	–108	99.1	+	+	+	..	....	....	4+	Pc3	$R_3 c_2$
M., 41	Insidious	D	Improved	III	R_3	24	Unfavor.	Unimpaired	164¾	...	72–88	97.8	..	+	..	...	T.B. colitis?	Ultra-violet ray pneumothorax	...	R-clear, inc.	pleurisy L-inc.
6352	Registered Nurse,	A	P.R. Mod. Adv. A.	III	L_3	15	Favor.	Unimpaired	116½	158½	72–96	98.3	+	+	+	..	Neurasthenia	....	...	Pc3	$R_2 a_1 L_3 b_2$
F., 50	W, Catarrhal	D	Ap. Arrested	...		21⅔	Favor.	Unimpaired	124½	...	72–96	97.8	..	○	..	45	Neurasthenia	....	...	R-stat. L-? inc.	
6353	Registered Nurse, S	A	Suspected Tbc.	...	....	11	Favor.	Unimpaired	138	130	72–100	98.1	–	–	–	..	Pleuritic effusion	....	○	Pt2	$R_1 a_0 L_1 a_0$
F., 23	Pleuritic c effusion	D	Suspected Tbc.	...	....	14½	Favor.	Unimpaired	135¾	...	72–120	98.6	..	–	..	Work 4-hours ...		....	...	R. & L-stat.	
6354	Machinist, S	A	P.R. Mod. Adv. A.	II	$R_1 L_2$	83	Favor.	Unimpaired	146	158½	68–88	98.3	+	+	+	..	....	....	4+	Pc3	$R_2 b_1 L_1 b_1$
M., 36	Post-pneumonia	D	Quiescent	II	$R_1 L_2$	88½	Favor.	Unimpaired	154	...	56–72	98.3	..	○	..	60	....	....	...	R. & L-clear	
6355	Bacteriologist, S	A	R. Mod. Adv. A.	I	R_1	180	Favor.	Impaired	138¼	148	.....	.....	+	○	+	..	....	....	2+	Pc3	$R_3 b_1 L_1 a_1$
M., 27	Tbc. Adenitis	D	Quiescent	...	....	191½	Favor.	Unimpaired	141¼	...	.....	.....	..	+	.	4-hours work ...		....	...	R. & L-clear.	
6356	Machinist, S	A	P.R. Far Adv. A.	III	$R_3 L_2$	10	Favor.	Unimpaired	107½	145½	62–92	98.3	+	+	+	..	......	....	○	Pc3	$R_3 c_1 L_3 c_2$
M., 30	Catarrhal	D	Quiescent	II	$R_1 L_1$	20½	Favor.	Unimpaired	100¼	...	72–78	98.5	..	+	..	Unlimited	......	....	...	R. & L-stat.	
6357	Housewife, M	A	R. Mod. Adv. A.	I	R_1	28	Favor.	Unimpaired	105	133½	80–112	98.7	○	○	–	.	Neurasthenia	....	○	Pc3	$R_2 b_1 L_1 a_1$
F., 34	Insidious	D	Ap. Arrested	...	....	32	Favor.	Unimpaired	102½	...	86–98	99.0	..	–	..	30	Neurasthenia	....	...	R-clear. L-stat.	

6358 B M., 33	Laborer, S Fistula-in-ano	A D	R. Far Adv. A. Unimproved	II II	$R_2 L_2$ $R_2 L_2$	48 $48\frac{1}{2}$	Favor. Favor.	Impaired Unimpaired	147 $140\frac{1}{2}$	182 ...	60–82 55–70	98.1 98.4	+ ..	○ ..	.. ..	.. 15	Paranoia ? Paranoia ?	....	4+ ...	Pc3 Not taken	$R_3 c_1 L_2 c_1$
6358 F., 31	Housewife, M Insidious	A D	P.R. Mod. Adv. A. Quiescent	II II	L_2 L_2	30 $36\frac{1}{4}$	Favor. Favor.	Unimpaired Unimpaired	150 151	138 ...	60–92 56–84	98.8 98.5	+ ..	○ ○	○ ..	.. 60	....	....	4+ ...	Pc3 R-clear. L-?	$R_2 a_1 L_3 b_1$ clear.
6359 F., 20	Comptometer op., S, Insidious	A D	R. Demonstrable Non-clinical Demonstrable Non-clinical	... ...	....	14 $15\frac{1}{4}$	Favor. Favor.	Unimpaired Unimpaired	123 120	$137\frac{1}{2}$ ...	90–100 76–90	98.7 98.7	○ ..	– ○	○ ..	.. 60	....	.... O. T. 2/1	○ ...	Pc3 R. & L-stat.	$R_3 a_1 L_1 a_1$
6360 M., 23	Clerk, S Insidious	A A	P.R. Mod. Adv. A. Quiescent	II II	$R_1 L_2$ $R_1 L_2$	36 42	Favor. Favor.	Unimpaired Unimpaired	$141\frac{3}{4}$ $150\frac{1}{4}$	157 ...	70–98 60–80	98.4 98.3	– ..	○ +	○ ..	.. Unlimited	.... Enteritis ?	.... Ultra-violet ray	2+ ...	Pc3 R. & L-clear.	$R_2 a_1 L_2 a_1$
6361 M., 23	Insurance, S Catarrhal	A D	P. Minimal A. Ap. Arrested	I ...	R_1	3 7	Favor. Favor.	Unimpaired Unimpaired	176 $181\frac{1}{2}$	169 ...	56–88 60–88	98.4 98.1	○ ..	○ ○	○ ..	.. Unlimited	....	.... O. T. 2/1	○ ...	Pc1 R-clear. L-stat.	$R_1 a_0$
6362 M., 20	Student, S Hemoptoic	A D	R. Mod. Adv. A. Ap. Arrested	I ...	R_1	2 8	Favor. Favor.	Unimpaired Unimpaired	139 138	144 ...	60–90 68–80	98.3 98.4	○ ..	○ –	○ ..	.. Unlimited	....	....	4+ ...	Pc3 R. & L-clear.	$R_3 b_1 L_1 b_1$
6363 F., 23	Housewife, M Insidious	A D	R. Mod. Adv. A. Ap. Arrested	... ...	....	29 35	Favor. Favor.	Unimpaired Unimpaired	121 $127\frac{1}{4}$	138 ...	66–88 58–64	98.6 98.7	– ..	– –	– ..	.. Unlimited	....	....	○ ...	Pc2 R-stat. L-?	$R_1 a_0 L_1 a_0$ inc.
6364 F., 32	Stenographer, S Catarrhal	A D	R. Far Adv. A. Ap. Arrested	... ...	....	4 $13\frac{1}{2}$	Favor. Favor.	Unimpaired Unimpaired	133 $141\frac{1}{2}$	144 ...	72–92 81–90	98.6 98.4	+ ..	○ ○	+ ..	.. Unlimited	Neurasthenia Neurasthenia	....	4+ ...	Pc2 R. & L-clear.	$R_1 b_2 L_1 a_1$
6366 F., 47	Housewife, M Insidious	A D	P.R. Mod. Adv. A. Quiescent	I I	R_2 R_2	5 $10\frac{1}{4}$	Favor. Favor.	Unimpaired Unimpaired	118 $131\frac{1}{2}$	131 ...	60–92 68–72	98.1 98.2	+ ..	○ ○	+ ..	.. Unlimited	Menopause Menopause	....	3+ ...	Pc3 R. & L-clear.	$R_3 b_1 L_2 a_0$
6367 M., 21	Student, S Insidious	A D	R. Mod. Adv. A. Quiescent	I ...	L_1	4 10	Favor. Favor.	Unimpaired Unimpaired	138 $142\frac{1}{2}$	136 ...	70–100 60–88	97.2 98.0	+ ..	+ ○	+ ..	.. 45	Periapical abscesses Colitis (Tbc.)	.... Ultra-violet ray	4+ ...	Pc3 R-stat. L-clear.	$L_3 b_1$
6368 F., 24	Student, S Insidious	A D	Suspected Tbc. Minimal Unimproved	... ...	....	6 16	Favor. Favor.	Unimpaired Unimpaired	$117\frac{1}{2}$ $123\frac{3}{4}$	140 ...	72–92 80–90	98.6 98.5	– ..	– –	– ..	.. 30	Pleurisy c effusion Pleurisy c effusion	Attempted Pneumothorax	○ ...	R-pleurisy c effusion R-clear. pleurisy L-stat dev. tbc.	
6370 F., 24	Clerk, S Insidious	A D	P. Far Adv. A. Quiescent	III III	$R_1 L_2$ $R_1 L_2$	13 $22\frac{1}{4}$	Favor. Favor.	Unimpaired Unimpaired	113 $109\frac{3}{4}$	127 ...	72–88 72–112	98.0 98.8	+ ..	○ ○	+ ..	.. Unlimited	Abscess of breast	.... Ultra-violet ray	4+ ...	Pc3 R-clear. L-clear. & inc. cav.	$R_1 b_1 L_2 b_1$
6371 F., 16	Student, S Tbc. Peritonitis	A D	R. Minimal A. Ap. Arrested	... ...	....	30 $34\frac{3}{4}$	Favor. Favor.	Unimpaired Unimpaired	$108\frac{1}{2}$ 123	128 ...	74–112 80–86	98.9 97.9	– ..	– –	– ..	.. Unlimited	Peritonitis ? Peritonitis ?	.... Ultra-violet ray	○ ...	Pc1 R-stat. L-def.	$L_1 b_1$ clear.
6372 B F., 26	Stenographer, S Insidious	A D	Non-Tbc. Non-Tbc.	... ...	....	26 $26\frac{3}{4}$	Favor. Favor.	Unimpaired Impaired	? $97\frac{1}{2}$	? ...	80–116 84–140	99.1 100.1	○ ..	○ ..	.. ..	.. ..	Asthma Asthma	....	○ ...	Pc1? Not taken	$R_1? a_0$

R = Patients having intensive rest treatment during first six weeks of residence,

No. Sex Age	Occupation Marital condition Onset		Condition	Extent of physical signs (Turban)		Duration of disease, months	General condition	Digestion	Weight		Range of pulse 7 days on admission 2 days on discharge	Av. max. temp. 7 days on admission 2 days on discharge	T. B.			Exercise in minutes	Complications	Tuberculin O. T. maximum dose or other treatment	Complement fixation	X-ray findings	
				Both lungs	Each lung				Actual	Standard			Previous	Admission—Discharge	Residence					Both lungs	Each lung
6372 M., 25	Paper Coater, M Pleuritic	A D	R. Mod. Adv. A. Quiescent	I I	R$_1$ L$_1$ L$_1$	17 $24\frac{1}{2}$	Favor. Favor.	Impaired Unimpaired	$144\frac{3}{4}$ 149	149 ...	58–88 62- 84	98.2 98.7	+ ..	○ –	○ ..	.. Unli	.... mited	....	4+ ...	Pc3 R. & L-clear.	R$_2$ a$_1$ L$_3$ c$_2$
6373 F., 39	Teacher, S Pleurisy c effusion	A D	R. Mod. Adv. A. Quiescent	I I	R$_1$ L$_1$ R$_1$ L$_1$?	155 161	Favor. Favor.	Unimpaired Impaired	$135\frac{3}{4}$ $130\frac{3}{4}$	$135\frac{1}{2}$ ...	60–88 56–70	98.2 99.2	– ..	○ ○	○ .. li	.. Un- mited	Angio-neurotic ed Angio-neurotic ed	ema .... ema	○ ...	Pc2 R. & L-def.	R$_1$ a$_1$ L$_1$ b$_1$ clear.
6374 M., 54	Clerk, M Catarrhal	A D	R. Far Adv. A. Quiescent	I I?	R$_1$ L$_1$ L?	2 7	Favor. Favor.	Unimpaired Unimpaired	$121\frac{1}{2}$ 150	$166\frac{3}{4}$ ...	68–88 80–108	98.9 100.2	+ ..	+ +	+ ..	.. 10	....	....	4+ ...	Pc3 R. & L-clear. shadow left	R$_2$ b$_1$ L$_3$ c$_2$ inc. annular
6375 M., 20	Clerk, S Catarrhal	A D	R. Mod. Adv. A. Quiescent	... ...	....	5 $14\frac{3}{4}$	Favor. Favor.	Impaired Unimpaired	$144\frac{1}{2}$ $152\frac{1}{2}$	156 ...	56–80 64–79	98.4 98.4	+ ..	○ ○	○ ..	.. 6C	....	....	4+ ...	Pc2 R-clear. L-st	R$_1$ b$_1$ L$_1$ b$_0$ at.
6376 F., 24	Housewife, M Catarrhal Post-flu	A D	R. Minimal A. Quiescent	... I	 L	7 $12\frac{1}{2}$	Favor. Favor.	Impaired Unimpaired	127 $142\frac{1}{2}$	133 ...	44–60 46–54	98.7 98.3	○ ..	○ ○	○ ..	.. Unli	.... mited	....	4+ ...	Pc1 R-stat. L-cle	L$_1$ a$_1$ ar.
6377 M., 25	Elec. Estimator, S Insidious	A D	R. Mod. Adv. A. Quiescent	I I	R$_1$ L$_1$	27 $36\frac{1}{4}$	Favor. Favor.	Unimpaired Unimpaired	$159\frac{3}{4}$ $155\frac{3}{4}$	148 ...	64–92 64–76	98.2 98.7	+ ..	+ +	+ ..	.. 60	....	....	4+ ...	Pc3 R. & L-clear.	R$_3$ b$_2$ L$_3$ b$_2$
6378 F., 23	Clothes Model, S Insidious, Post-flu.	A D	R. Mod. Adv. A. Ap. Arrested	... ...	... .	60 65	Favor. Favor.	Unimpaired Unimpaired	$129\frac{1}{2}$ $124\frac{1}{2}$	$130\frac{1}{2}$ ...	68–104 72–88	97.9 98.1	○ ..	+ ○	+ ..	.. 45	....	Ultra-violet ray Autogenus vaccine	4+ ...	Pc1 R-clear. L-?	R$_1$ b$_1$ L$_1$ b$_1$ clear.
6379 M., 19	Salesman, S Catarrhal	A D	P. Mod. Adv. A. Quiescent	II II	L$_2$ L$_2$	12 20	Favor. Favor.	Unimpaired Unimpaired	155 $148\frac{1}{2}$	$152\frac{1}{2}$ ...	64–92 70–80	98.2 98.3	+ ..	– ○	○ ..	.. Unli	.... mited	....	4+ ...	Pc1 R-stat. L-cle	R$_1$ a$_1$ L$_1$ b$_1$ ar.
6381 M., 25	Shipping Clerk, S Hemoptoic	A D	P.R. Mod. Adv. A. Quiescent	II I	R$_1$ L$_1$ R$_1$ L$_1$	66 $69\frac{1}{2}$	Favor. Favor.	Impaired Unimpaired	$138\frac{1}{2}$ $142\frac{1}{4}$	150 ...	68–92 68–78	98.4 98.8	– ..	○ ○	+ ..	.. 60	....	....	4+ ...	Pc3 R. & L-clear.	R$_3$ a$_1$ L$_3$ a$_1$
6382 M., 25	Clerk, S Hemoptoic	A D	R. Mod. Adv. A. Ap. Arrested	... ...	....	3 $10\frac{3}{4}$	Favor. Favor.	Impaired Unimpaired	119 $131\frac{1}{4}$	143 ...	72–96 80–94	99.1 98.5	+ ..	○ –	○ ..	.. Unli	.... mited	....	4+ ...	Pc2 R. & L-clear.	R$_2$ b$_1$
6385 M., 23	Theol. Student, S Catarrhal	A D	R. Minimal A. Quiescent	... I	 L	17 $22\frac{2}{3}$	Favor. Favor.	Unimpaired Unimpaired	$138\frac{1}{2}$ $134\frac{1}{2}$	150 ...	60–80 52-70	98.6 98.5	– ..	○ –	○ ..	.. Unli	.... mited	....	4+ ...	Pc2 R. & L-clear.	R$_1$ b$_1$ L$_1$ b$_1$
6386 F., 41	Housewife, M Pleuritic c effusion	A D	R Mod. Adv. A. Quiescent	I I?	L$_1$ L$_1$	60 $65\frac{1}{4}$	Favor. Favor.	Impaired Impaired	$163\frac{1}{2}$ $168\frac{3}{4}$	140 ...	60–84 66–80	98.5 98.6	– ..	+ +	+ ..	.. Unli	.... mited	....	○ ...	Pc2 R-?clear. L-s	R$_1$ a$_0$ L$_2$ c$_1$ tat.

6387	Architect, M	A	Non-Tbc.	...	....	120	Favor.	Impaired	171¾	174	52–84	97.7	○	○	—	..	....	....	○	Pt1	$R_1 a_0 L_1 a_0$
M., 48	? Pleuritic	D	Non-Tbc.	...	....	121¼	Favor.	Unimpaired	176¾	...	64–78	97.8	..	—	..	90	....	O. T. 2/3	...	R. & L-stat.	
	c effusion																				
6388	Telephone Oper., S	A	C. Far Adv. A.	III	$R_2 L_2$	300	Favor.	Unimpaired	119	148	68–92	98.2	○	○	○	..	Nephritis-Lupus	....	4+	Pc2	$R_1 b_1 L_1 a_1$
F., 54	Catarrhal	D	Quiescent	II	$R_1 L_1$	309¼	Favor.	Unimpaired	111	...	68–80	98.6	..	○	..	Un-	Nephrectomy	Ultra-violet ray	...	R. ? clear. L	-stat.
															li	mited	Lupus				
6389	Real Estate Broker	A	R. Minimal A.	...	....	72	Favor.	Unimpaired	148	178	60–84	98.3	—	—	○	..	....	....	4+	Pc1	$R_1 b_1$
M., 30	M, Pleuritic	D	Ap. Arrested	...	....	76	Favor.	Unimpaired	151½	...	64–82	98.3	..	—	..	Unli	mlted	....	...	R-clear. L-st	at.
6390	Telegrapher, S	A	P.R. Mod. Adv. B.	III	$R_3 L_0$	6	Favor.	Impaired	124½	144	80–112	99.7	—	○	+	..	....	....	○	Pc3	$R_3 c_2 L_1 b_1$
M., 35	Catarrhal	D	Quiescent	II	R_2	11	Favor.	Unimpaired	129¾	...	76–87	98.7	..	+	..	30	....	....	...	R. & L-clear.	
6391	Nurse-in-Training,	A	R. Mod. Adv. B.	I	L_1	9	Favor.	Unimpaired	158½	129	80–110	98.6	—	—	—	..	....	....	4+	Pc3	$R_3 a_1 L_3 b_1$
F., 22	S, Catarrhal	D	Quiescent	I	L	15	Favor.	Unimpaired	145½	...	60–86	98.5	..	—	..	60	....	....	...	R. & L-clear.	
6392 A	Stenographer, S	A	R. Mod. Adv. A.	...	....	44	Favor.	Unimpaired	125¾	126	.....	.....	+	—	—	..	....	....	...	Pc3	$R_2 b_1 L_2 b_1$
F., 25	Catarrhal	D	Ap. Arrested	...	....	50¼	Favor.	Unimpaired	134	...	.....	.....	..	—	..	Wor	k 4-hours ...	....	...	R. & L-clear.	
6392	Housewife, M	A	P.R. Mod. Adv. A.	II	$R_1 L_1$	48	Favor.	Unimpaired	138	145	60–92	98.3	+	○	○	..	....	....	4+	Pc2	$R_1 b_1 L_1 b_1$
F., 38	Insidious	D	Ap. Arrested	...	....	52	Favor.	Unimpaired	143	...	72–78	98.5	..	○	..	60	....	....	...	R.? clear. L-	clear.
6393	Nurse, S	A	R. Minimal A.	...	....	21	Favor.	Unimpaired	125	149	60–88	98.8	+	—	—	..	....	....	4+	Pc1	$L_1 a_0$
F., 23	Catarrhal	D	Ap. Arrested	...	....	26¾	Favor.	Unimpaired	126¼	...	72–84	98.9	..	—	..	60	....	....	...	R. & L-stat.	
6394	Student, S	A	Suspected Tbc.	...	....	168	Unfavor.	Impaired.	111	130	64–90	98.9	○	○	○	..	Neurasthenia	....	○	Pt1	$R_1 a_0$
F., 29	Insidious	D	Suspected Tbc.	...	....	173½	Favor.	Unimpaired	106	...	92–94	99.2	..	○	..	..	Neurasthenia	Ultra-violet ray	...	R. & L-stat.	
6395 B	Salesman, S	A	Suspected Tbc.	I	R	5	Favor.	Unimpaired	165¼	172½	76–116	98.6	—	—	—	..	Pleurisy	....	○	Pleurisy	
M., 26	Pleuritic c effusion	D	Suspected Tbc.	I	R	5½	Favor.	Unimpaired	166¾	...	68–86	98.6	..	—	..	..	Pleurisy	....	...	Not taken	
6396	Pullman Agent, M	A	P.R. Mod. Adv. A.	II	$R_1 L_1$	240	Favor?	Impaired	170¾	160	56–84	98.3	○	○	○	..	....	....	4+	Pc3	$R_3 c_1 L_3 b_1$
M., 49	Catarrhal	D	Quiescent	II	$R_1 L_1$	243	Favor.	Unimpaired	170½	...	58–70	98.4	..	○	..	Unli	mited	....	...	R-clear. L-st	at.
6397	School Teacher, M	A	P.R. Mod. Adv. A.	I	$R_1 L_1$	6	Favor.	Unimpaired	145½	125	72–100	98.2	+	○	○	..	....	....	4+	Pc3	$R_3 b_1 L_3 b_1$
F., 27	Catarrhal	D	Quiescent	I	$R_1 L_1$	10⅔	Favor.	Unimpaired	153	...	76–84	98.3	..	○	..	Unli	mited	....	...	R-clear. L-st	at.
6398	Camera Maker, M	A	P.R. Mod. Adv. A.	III	$R_3 L_2$	60	Favor.	Unimpaired	195	210½	60–84	97.6	+	—	—	..	....	....	○	Pc3	$R_1 b_1 L_2 b_1$
M., 51	Catarrhal	D	Quiescent	II	$R_2 L_2$	64⅓	Favor.	Unimpaired	210	...	74–86	98.4	..	—	..	Unli	mited	....	...	R. & L-clear.	
6400	Telephone Oper., S	A	R. Minimal A.	...	....	12	Favor.	Unimpaired	120½	120	72–96	98.5	○	○	○	..	....	....	4+	Pc1	$R_1 b_1$
F., 31	Catarrhal	D	Ap. Arrested	...	....	18	Favor.	Impaired	106	...	80–92	98.6	..	—	..	45	....	O. T. 2/5	...	R-clear. L-st	at.
6401	Student, S	A	C. Far Adv. A.	I	L_1	12	Unfavor.	Unimpaired	128½	?	72–100	98.9	—	—	—	..	Colitis (Tbc.)	....	○	Pc3	$R_3 b_1 L_3 b_1$
M., 20	Catarrhal	D	Dead	...	....	16¾	Dead	Dead	...	...	122–168	102 4	..	+	..	..	Colitis (Tbc.)	Ultra-violet ray	...	R. & L-inc.	
6402 A	Telephone Oper, S	A	P.R. Mod. Adv. A.	I	R_1	34½	Favor.	Unimpaired	100¾	119¼	59–80	98.4	+	—	○	..	....	....	...	Pc2	$R_2 a_1$
F., 21	Insidious	D	Quiescent	I	R_1	41¾	Favor.	Unimpaired	99	...	68–72	98.7	..	○	..	Unli	mited	....	...	R-clear. L-st	at.

R = Patients having intensive rest treatment during first six weeks of residence.

No. Sex Age	Occupation Marital condition Onset		Condition	Extent of physical signs (Turban)		Duration of disease, months	General condition	Digestion	Weight		Range of pulse 7 days on admission 2 days on discharge	Av. max. temp. 7 days on admission 2 days on discharge	T.B.			Exercise in minutes	Complications	Tuberculin O. T. maximum dose or other treatment	Complement fixation	X-ray findings	
				Both lungs	Each lung				Actual	Standard			Previous	Admission—Discharge.	Residence					Both lungs	Each lung
6402	Clerk, S	A	R. Mod. Adv. A.	I	L_2	5	Favor.	Unimpaired	165	159	60–84	98.4	+	○	+	..	....	....	4+	Pc3	$R_1 a_0 L_3 b_1$
M., 28	Catarrhal	D	Unimproved	III	$R_3 L_2$	12½	Unfavor.	Unimpaired	161½	...	84–100	99.5	..	+	..	..	Pneumonia ?	....	...	R-dev. bronc	ho-pneumonia
																				L-clear.	
6404	Bookkeeper, S	A	P.R. Mod. Adv. A.	II	R_2	2	Favor.	Unimpaired	154	162	60–78	97.9	○	○	○	..	....	....	4+	Pc3	$R_3 b_1 L_1 a_1$
M., 31	Hemoptoic	D	Quiescent	I	R_1	10¾	Favor.	Unimpaired	155½	...	60–74	98.0	..	○	..	Unli	mited	....	...	R. & L-clear.	
6406	Student, S	A	Suspected Tbc.	I	L_1	4	Favor.	Unimpaired	151	150½	50–68	98.4	—	○	○	..	....	....	○	Pleurisy	
M., 18	Pleuritic effusion	D	Suspected Tbc.	...	....	7	Favor.	Unimpaired	162⅔	...	58–64	98.4	..	—	..	Unli	mited	....	...	R-clear. of pl	eurisy, L-stat.
6407	Pipe Coverer, S	A	R. Mod. Adv. A.	I	R_1	1½	Favor.	Unimpaired	172¾	162	80–128	98.2	+	+	○	..	....	....	4+	Pc3	$R_2 b_1 L_2 a_0$
M., 39	Hemoptoic	D	Quiescent	I	$R_1 L_1$	9	Favor.	Unimpaired	186¼	...	65–84	98.4	..	○	..	Unli	mited	....	...	R. & L-clear.	
6408	Clerk, S	A	R. Mod. Adv. A.	...	....	6	Favor.	Unimpaired	141	158	60–96	98.9	+	+	+	..	....	....	4+	Pc3	$R_3 b_1 L_2 a_1$
M., 22	Catarrhal	D	Unimproved	...	....	12	Favor.	Unimpaired	150½	...	62–80	98.0	..	+	..	15	....	....	....	R-inc. L-clea	r.
6409 A	Teacher-Librarian,	A	P.R. Far Adv. B	III	$R_2 L_1$	60	Favor.	Unimpaired	124¾	124	82–100	98.6	+	+	+	..	....	....	4+	Pc3	$R_3 c_2 L_3 b_2$
F., 27	S, Catarrhal	D	Unimproved	III	$R_2 L_1$	66	Unfavor.	Unimpaired	120½	...	84–96	98.7	..	○	..	..	Nephritis	Ultra-violet ray	...	R-? inc. cavi	ty, L-? inc.
6409	Housewife, M	A	C. Far Adv. B.	II	$R_1 L_2$	26	Unfavor.	Impaired	119	125	68–86	99.2	+	+	+	..	Colitis (Tbc.)	Pneumothorax	○	Pc3	$R_2 a_0 L_3 c_2$
F., 26	Insidious	D	Improved	II	L_2 pneu-	31½	Unfavor.	Unimpaired	113¾	...	62–82	98.6	..	○	..	..	Colitis (Tbc.)	Ultra-violet ray	...	R-sli. clear.&	inc. haziness
					mothora	x														L-pneumoth	orax, 90○ comp
6410	Teacher, S	A	R. Mod. Adv. A.	I	R_1? L_1	12	Favor.	Unimpaired	121	120¼	72–84	98.4	+	+	+	..	....	....	4+	Pc3	$R_3 b_2 L_3 a_1$
F., 23	Insidious	D	Quiescent	I	$R_1 L_0$	18	Favor.	Unimpaired	119½	...	72–82	98.5	..	○	..	Unli	mited	....	...	R-def. caviti	es, L-inc. fibro-
																				sis	
6412	Registered Nurse, S	A	P.R. Minimal A.	I	R_1	14	Favor.	Unimpaired	112	131	60–80	98.3	○	○	○	..	....	....	○	Pc1	$R_1 b_1$
F., 26	Insidious	D	Ap. Arrested	...	....	18	Favor.	Impaired	114¾	...	70–86	98.4	..	○	..	45	....	O. T. 2/5	...	R. & L-stat.	
	Post-pneumonia																				
6413	Student, S	A	P.R. Mod. Adv. A.	II	$R_1 L_2$	3	Favor.	Unimpaired	145½	132	64(104	98.3	+	+	+	..	....	....	○	Pc3	$R_1 a_1 L_3 b_1$
M., 18	Hemoptoic	D	Quiescent	II	L_2	10¼	Favor.	Unimpaired	143½	...	82–88	98.4	..	○	..	..	....	....	...	R. & L-clear.	
6414	Hairdresser, M	A	P.R. Mod. Adv. A.	II	$R_1 L_1$	132	Favor.	Unimpaired	129½	151	64–96	98.5	—	+	+	..	....	....	4+	Pc3	$R_1 b_1 L_3 c_2$
F., 36	Pleuritic effusion	D	Unimproved	III	$R_1 L_2$	140¼	Unfavor.	Unimpaired	132	...	68–92	99.5	..	+	..	..	....	....	...	R-stat. L-inc	.
6415	Clerk, S	A	R. Mod. Adv. A.	...	....	30	Favor.	Unimpaired	136	146	64–92	98.1	+	○	○	..	....	....	○	Pc2	$R_1 a_0 L_2 b_1$
M., 20	Catarrhal	D	Quiescent	I	L	36	Favor.	Unimpaired	130½	...	60–88	98.7	..	○	..	Unli	mited	....	...	R. & L-clear.	

6416 F., 26	Registered Nurse, S Insidious, Post-flu.	A D	R. Minimal A. Quiescent	... ...	... .	62 $63\frac{1}{2}$	Favor. Favor.	Unimpaired Unimpaired	165 165	135 ...	64–96 76–98	98.4 98.6	○ ..	○ ○	○ ..	.. 45	....	....	○ ...	Pc1 R-stat. L-? c	L_1 b_1 lear.
6417 F., 30	Dentist, M Pleuritic c effusion	A D	R. Mod. Adv. A. Quiescent	... ...	....	4 6	Favor. Favor.	Unimpaired Impaired	$116\frac{3}{4}$ $115\frac{1}{2}$	131 ...	84–112 92–128	98.4 100.4	○ ..	— —	○ ..	.. ..	Neurasthenia- wet pleurisy Neurasthenia- Genital	....	○ ...	Pc3 R-clear. L-pr pleurisy	R_1 b_1 L_3 b_1 ob. clear., clear.
6418 F., 33	Housewife, M Hemoptoic	A D	R. Mod. Adv. A. Ap. Arrested	... ...	....	5 9	Favor. Favor.	Unimpaired Unimpaired	153 145	137 ...	72–84 62–70	98.3 98.5	+ ..	○ —	○ ..	.. 45	....	....	○ ...	Pc2 R-stat. L-?cl	R_1 a_0 L_2 b_1 ear.
6419 F., 20	Clerk, S Catarrhal Post-grippe	A D	Non-Tbc. Non-Tbc.	... ...	....	16 $17\frac{1}{4}$	Favor. Favor.	Unimpaired Unimpaired	$125\frac{1}{2}$ $120\frac{1}{2}$	138 ...	66–90 80–88	98.3 98.4	— ..	— —	— .. li	.. Un- mited	Neurasthenia Neurasthenia	....	3+ ...	Pt1 R. & L-stat.	R_1 a_1
6420 M., 22	Correspondent, S Catarrhal	A D	R. Mod. Adv. A. Ap. Arrested	... ? I	.... L?$_1$	4 10	Favor. Favor.	Unimpaired Unimpaired	149 $145\frac{1}{4}$	142 ...	72 96 74–86	98.4 98.4	+ ..	○ ○	○ ..	.. Unli	.... mited	....	4+ ...	Pc3 R. & L-clear.	R_1 b_1 L_3 b_1
6422 F., 25	Attorney, S Insidious	A D	R. Minimal A. Ap. Arrested	... I ?	.... R?	14 21	Favor. Favor.	Impaired Unimpaired	$105\frac{1}{2}$ $110\frac{1}{4}$	133 ...	68–92 72–86	98.5 98.3	+ ..	○ ○	+ ..	.. 45	....	.... Ultra-violet ray	4+ ...	Pc1 R-clear. L-st	R_1 b_1 L_1 a_1 at.
6423 B M., 24	Student, S Hemoptoic	A D	R. Minimal A. Quiescent	... ...	....	$2\frac{1}{2}$ 3	Favor. Favor.	Unimpaired Unimpaired	$118\frac{3}{4}$ 119	$141\frac{3}{4}$ ...	64–88	98.2	○ ..	○ ..	.. ..	.. 5	....	....	○ ...	Pc1 Not taken	R_1 b_1
6423 M., 18	Typist, S Catarrhal	A D	Suspected Tbc. Suspected Tbc.	... ...	....	3 $4\frac{1}{4}$	Favor. Favor.	Unimpaired Unimpaired	139 $140\frac{1}{4}$	144 ...	70–100 72–100	98.3 98.5	+ ..	— ○	○ ..	.. 120	....	....	4+ ...	Pt2 R. & L-stat.	L_2 a_0
6424 F., 31	Housewife, M Catarrhal	A D	P.R. Mod. Adv. A. Improved	I II	R_1 L_1? R_1 L_1	16 $22\frac{1}{4}$	Favor. Favor.	Unimpaired Unimpaired	$155\frac{3}{4}$ $154\frac{1}{4}$	151 ...	76–92 80–84	98.8 98.6	+ ..	+ +	○ ..	.. ..	.... Bronchitis	....	4+ ...	Pc2 R. & L-clear.	R_1 c?$_1$ L_1 a_1
6425 F., 37	Housewife, M Insidious	A D	P.R. Mod. Adv. A. Quiescent	II I	R_1 L_1 R L	18 24	Favor. Favor.	Unimpaired Unimpaired	$120\frac{1}{2}$ 125	134 ...	68–88 70–88	98.4 98.9	+ ..	○ ○	○ ..	.. Unli	.... mited	....	○ ...	Pc3 R. & L-clear.	R_3 b_1 L_2 b_1
6426 B F., 24	Registered Nurse, S Hemoptoic	A D	P.R. Minimal A. Unimproved	I I	R_1 R	4 $4\frac{1}{3}$	Favor. Favor.	Unimpaired Unimpaired	$114\frac{1}{4}$ ...	127 ...	76–100	98.3	○ ..	— ..	.. ..	.. ..	....	....	3+ ...	Pc2 Not taken	R_2 b_1
6426 F., 28	School Teacher, S Catarrhal	A D	R. Mod. Adv. A. Unimproved	I I	R R	$4\frac{1}{2}$ $10\frac{1}{2}$	Favor. Favor.	Unimpaired Unimpaired	$151\frac{1}{2}$ $142\frac{1}{2}$	140 ...	80–90 64–84	98.8 98.8	+ ..	+ +	+ ..	.. 45	....	....	4+ ...	Pc2 R. & L-inc.	R_2 b_2 L_1 a_1
6427 M., 36	Butler, M Catarrhal	A D	R. Mod. Adv. A. Quiescent	I I	L_1 L	288 295	Favor. Favor.	Unimpaired Unimpaired	$142\frac{3}{4}$ 151	149 ...	74–96 70–88	97.4 98.0	+ ..	+ ○	○ ..	.. Unli	.... mited	....	4+ ...	Pc3 R. & L-clear.	R_2 b_2 L_2 b_1
6429 M., 26	Indust. Engineer, M, Catarrhal	A D	P.R. Mod. Adv. A. Quiescent	II I	R_1 L_2 R L	9 $15\frac{1}{2}$	Unfavor. Favor.	Impaired Unimpaired	135 $143\frac{1}{2}$	$165\frac{1}{2}$ ...	72–90 62–80	98.2 98.5	+ ..	○ ○	+ ..	.. 60	....	.... Ultra-violet ray	4+ ...	Pc3 R. & L-clear.	R_2 b_1 L_3 b_1

R = Patients having intensive rest treatment during first six weeks of residence.

No. Sex Age	Occupation Marital condition Onset		Condition	Extent of physical signs (Turban)		Duration of disease, months	General condition	Digestion	Weight		Range of pulse 7 days on admission 2 days on discharge	Av. max. temp. 7 days on admission 2 days on discharge	T. B.			Exercise in minutes	Complications	Tuberculin O. T. maximum dose or other treatment	Complement fixation	X-ray findings	
				Both lungs	Each lung				Actual	Standard			Previous	Admission—Discharge	Residence					Both lungs	Each lung
6430 M., 30	Architect, S Catarrhal	A D	P.R. Mod. Adv. A. Unimproved	I II	R? L_1 R_0 L pneumothorax	4 11	Unfavor. Unfavor.	Impaired Unimpaired	140¾ 137	161 ...	72–90 80–106	98.9 99.0	+ ..	+ +	+ ..	.. ..	....	.... Ultra-violet ray Pneumothorax	4+ ...	Pc3 R. dev. tbc. ax cavity s	$L_3\ c_2$ L-pneumothor- ug.
6431 F., 27	Deaconess, S Insidious	A D	R. Mod. Adv. A. Quiescent	... I	.... R	108? 114	Favor. Favor.	Impaired Unimpaired	108 108	136 ...	76–100 84–98	98.0 98.8	○ ..	○ ○	○ ..	.. 60	Enteroptosis Enteroptosis	....	2+ ...	Pc3 R-clear. L-st	$R_3\ b_1$ at.
6433 F., 28	Housewife, M Insidious following childbirth	A D	R. Far Adv. A. Improved	II III	$R_2\ L_1$? $R_3\ L_3$	32 39½	Favor. Unfavor.	Unimpaired Unimpaired	101 104¾	129 . .	82–108 80–96	98.5 98.5	+ ..	○ +	+ ..	.. ..	....	.... Ultra-violet ray	4+ ...	Pc3 R-clear & inc	$R_3\ c?_2\ L_3\ b_1$. L-clear.
6434 M., 29	Medical Student, S Catarrhal	A D	R. Minimal A. Improved	... ...	....	36? 37⅓	Favor. Favor.	Unimpaired Unimpaired	129½ 132½	150 ...	64–84 60–80	98.3 98.3	+ ..	○ ○	○ ..	.. 30	....	.... O. T. 2/5	4+ ...	Pathological R. & L-stat.	change ? tbc.
6436 F., 19	Stenographer, S Insidious	A D	R. Mod. Adv. A. Quiescent	... II	.... $R_1\ L_1$	8 12	Favor. Favor.	Unimpaired Unimpaired	133 125¾	127 ...	68–88 63–80	98.1 98.5	+ ..	○ ○	○ ..	.. 45	....	....	○ ...	Pc2 R. & L-stat.	$R_1\ a_1\ L_1\ b_1$
6437 M., 22	Electrician, S Catarrhal	A D	R. Mod. Adv. A. Quiescent	I I	L_1 L	8 14	Favor. Favor.	Unimpaired Unimpaired	171 170	158 ...	56–82 71–89	98.4 98.6	+ ..	— —	— ..	.. Unli	.... mited	....	4+ ...	Pc2 R-stat. L-cle	$R_2\ a_1\ L_2\ b_1$ ar.
6438 F., 31	Housewife, M Insidious	A D	Non-Tbc. Non-Tbc.	I ?I	R_1? L_1 R_1?	24 26¾	Favor. Favor.	Impaired Unimpaired	93 101½	129 ...	60–84 70–80	98.6 98.3	○ ..	— —	○ ..	.. 25	Neurasthenia Neurasthenia	.... Ultra-violet ray	○ ...	Isolated tube R. & L-stat.	rcles
6439 F., 21	Stenographer, S Insidious	A D	R. Mod. Adv. A. Quiescent	I I	$R_1\ L_1$ R L	36 42	Favor. Favor.	Unimpaired Unimpaired	122 114½	133 ...	68–92 78–86	98.1 98.6	○ ..	○ ○	○ ..	.. Unli	.... mited	.... Ultra-violet ray	○ ...	Pc3 R. & L-clear.	$R_2\ b_1\ L_2\ b_1$
6440 F., 19½	Nurse-in-Training, S Insidious	A D	R. Mod. Adv. A. Dead	I ...	L_1	3 5	Favor. Dead	Unimpaired Dead	138 136	124½ ...	64–88 132–148	98.5 102.6	+ ..	— +	+ ..	.. ..	.... Tbc. colitis (auto	.... psy)	○ ...	Pc3 R. & L-inc.	$R_2\ a_1\ L_2\ b_1$
6441 F., 37	Librarian, S Insidious	A D	Non-Tbc. Non-Tbc.	... ...	....	12? 14¾?	Favor. Favor.	Unimpaired Unimpaired	114 110	142 ...	80–100 80–93	98.3 98.3	— ..	— —	— ..	.. 60	Neurasthenia Neurasthenia	....	○ ...	Pc1? R. & L-stat.	R_1? a_0
6443 M., 53	Watchman, S Hemoptoic	A D	R. Minimal A. Ap. Arrested	... ...	....	144? 150	Favor. Favor.	Unimpaired Unimpaired	140 153	157 ...	52–80 68–80	98.2 98.5	— ..	○ ○	+ ..	.. Unli	.... mited	....	○ ...	Pc2 R. more calci	$R_1\ b_1\ L_1\ b_1$ fication, L-stat.
6445 M., 27	Physician, M Hemoptoic	A D	R. Minimal A. Ap. Arrested	... ...	....	3 6½	Favor. Favor.	Unimpaired Unimpaired	136 144	134 ...	60–92 60–90	98.5 98.6	— ..	— —	— ..	.. 60	....	....	○ ...	Pc1 R-stat. L-cle	R_1? $a_0\ L_1\ b_1$ ar.
6446 F., 23	School Teacher, S Catarrhal	A D	R. Mod. Adv. A. Quiescent	... I	 L	5 11	Favor. Favor.	Unimpaired Unimpaired	145 132¾	141¾ ...	60–92 70–88	98.2 98.6	○ ..	— —	— ..	.. Unli	.... mited	....	4+ ...	Pc2 R-stat. L-cle	$R_1\ a_0\ L_2\ b_1$ ar.

6447	Stenographer, S	A	R. Mod. Adv. A.	...	....	15	Favor.	Impaired	119	145	70–100	98.0	+	○	○	..	....	....	4+	Pc3	$R_2\ b_1\ L_1\ b_1$
F., 25	Catarrhal	D	Ap. Arrested	...	....	$20\frac{3}{4}$	Favor.	Unimpaired	128	...	74–90	98.4	..	○	..	Unli	mited	Ultra-violet ray	...	R-clear. L-	stat.
6448	Cashier, S	A	P.R. Mod. Adv. A.	I	R_2	5	Favor.	Unimpaired	$156\frac{3}{4}$	177	70–92	97.7	+	○	○	..	....	....	○	Pc3	$R_3\ b_2\ L_1\ b_2$
M., 33	Catarrhal	D	Quiescent	I	R_1	$8\frac{3}{4}$	Favor.	Unimpaired	155	...	73–84	98.2	..	+	..	60	....	....	...	R. & L-cle	ar.
6451	Physician, S	A	P.R. Minimal A.	I	$R_0\ L_1$	10	Favor.	Unimpaired	$171\frac{1}{2}$	154	60–88	98.8	○	○	○	..	....	....	4+	Pc1	$R_1\ ?a_0\ L_1\ a_0$
M., 27	Hemoptoic	D	Ap. Arrested	...	....	$14\frac{3}{4}$	Favor.	Unimpaired	$166\frac{1}{2}$	...	58–76	98.8	..	−	..	Unli	mited	....	...	R-stat. L-	clear.
6452	Student, S	A	R. Mod. Adv. A.	...	....	12	Favor.	Unimpaired	$132\frac{1}{2}$	163	54–84	98.4	+	−	−	..	....	....	4+	Pc2	$L_2\ b_1$
M., 27	Insidious	D	Ap. Arrested	...	....	15	Favor.	Unimpaired	128	...	64–76	98.5	..	−	..	60	....	....	...	R-stat. L-	clear.
6456	Housewife, M	A	C. Far Adv. A.	I	R_1	68	Favor.	Unimpaired	$103\frac{1}{4}$	129	72–100	98.7	−	−	−	..	Colitis (Tbc.)	....	4+	Pc3	$R_3\ b_1$
F., 22	Insidious	D	Quiescent	I	R	$70\frac{1}{2}$	Favor.	Unimpaired	$105\frac{1}{4}$	...	74–90	98.3	..	−	..	30	Colitis (Tbc.)	Ultra-violet ray	...	Not take	n
6458	Stenographer, S	A	P.R. Mod. Adv. A.	III	R_3	28	Favor.	Unimpaired	105	134	64–92	98.2	−	○	○	..	....	....	4+	Pc3	$R_3\ b_2\ L_1\ ?a_1$
F., 39	Insidious	D	Quiescent	II	R_2	33	Favor.	Unimpaired	$130\frac{3}{4}$	...	74–96	98.3	..	○	..	Unli	mited	....	...	R-clear. de	v. calcified area
																				L-stat.	
6459	Newspaper Worker	A	P.R. Mod. Adv. A.	II	$R_1\ L_1$	12	Favor.	Unimpaired	$156\frac{1}{2}$	148	64–84	98.3	+	+	+	..	....	....	4+	Pc2	$R_1\ b_2\ L_1\ a_1$
M., 19	S, Hemoptoic	D	Quiescent	III	$R_2\ L_2$	18	Favor.	Unimpaired	$162\frac{3}{4}$	...	68–84	98.4	..	+	..	Unli	mited	....	...	R. & L-cle	ar.
6463	Mech. Engineer, S	A	R. Mod. Adv. A.	...	....	2	Favor.	Unimpaired	$144\frac{1}{2}$	150	60–92	98.5	+	○	+	..	....	....	4+	Pc2	$R_2\ b_1$
M., 24	Hemoptoic	D	Ap. Arrested	...	....	8	Favor.	Unimpaired	$145\frac{1}{2}$	...	72–86	98.6	..	○	..	Unli	mited	....	...	R-clear. L-	stat.
6465	Housewife, M	A	Non-Tbc.	...	....	24?	Favor.	Unimpaired	146	140	68–108	98.6	−	○	○	..	Retroversion	....	○	Isolated tu	bercles, bronchitis
F., 34	Insidious	D	Non-Tbc.	...	....	26?	Favor.	Unimpaired	$149\frac{3}{4}$	...	88–96	98.2	..	○	..	15	Retroversion	Ultra-violet ray	...	R. & L-sta	t.
6466	Bookbinder, M	A	R. Mod. Adv. A.	I	R_1	22	Favor.	Unimpaired	$174\frac{1}{2}$	171	56–84	98.5	+	+	+	..	....	....	○	Pc3	$R_2\ c_1\ L_2\ b_1$
M., 29	Pleuritic	D	Quiescent	I	R	$27\frac{1}{4}$	Favor.	Unimpaired	$198\frac{1}{2}$	...	58–74	98.2	..	+	..	Unli	mited	....	...	R. & L-sta	t.
6468	Bookkeeper, M	A	R. Mod. Adv. A.	?I	$R?_1$	24	Favor.	Unimpaired	$121\frac{1}{2}$	132	52–78	98.8	−	−	−	..	....	....	○	Pc3	$R_3\ b_1\ L_1\ a_1$
F., 27	Pleuritic	D	Quiescent	I	R	28	Favor.	Unimpaired	$126\frac{3}{4}$	...	58–72	98.8	..	−	..	60	....	....	...	R-clear. L-	stat.
6470	Salesman, S	A	R. Minimal A.	...	....	5?	Favor.	Impaired	121	$140\frac{1}{2}$	64–102	98.8	−	○	○	..	....	....	4+	Pc1	$R_1\ ?a_0\ L_1\ a_1$
M., 22	Catarrhal	D	Ap. Arrested	...	....	11	Favor.	Unimpaired	136	...	66–78	98.1	..	−	..	Unli	mited	....	...	R-stat. L.	more fibrosis
6471	Nurse, S	A	Non-Tbc.	I	L_1	32?	Favor.	Unimpaired	124	125	76–140	99.1	−	○	○	..	Psychasthenia ?	....	○	Pc1?	$L_1?\ a_1$
F., 26	Insidious	D	Non-Tbc.	I	L_1	$37\frac{1}{2}$	Favor.	Unimpaired	123	...	84-102	99.0	..	○	..	10	Psychasthenia ?	O. T. 1/1	...	R. & L-sta	t.
6473	Bank Clerk, M	A	C. Far Adv. A.	I	R_1	54	Unfavor.	Unimpaired	143	160	76–106	98.4	−	+	−	..	Nephritis	....	○	Pc3	$R_3\ b_1\ L_3\ b_2$
M., 45	Catarrhal	D	Unimproved	...	....	$55\frac{1}{4}$	Unfavor.	Unimpaired	...	...	86–124	98.8	..	−	..	..	Nephritis	....	...	R. & L-sta	t. L. dev. pleurisy
6474	Salesman, M	A	R. Mod. Adv. A.	...	....	4?	Favor.	Unimpaired	$139\frac{1}{2}$	145	64–80	98.2	+	○	+	..	....	....	4+	Pc2	$R_1\ b_1\ L_1\ b_1$
M., 25	Insidious	D	Quiescent	...	....	$8\frac{1}{2}$	Favor.	Unimpaired	$147\frac{1}{4}$	...	66–80	98.3	..	+	..	Unli	mited	Ultra-violet ray	...	R. & L-cle	ar.
6476	Sales Engineer, M	A	P.R. Mod. Adv. A.	II	$R_2\ L_2$	3?	Favor.	Unimpaired	$134\frac{1}{2}$	$164\frac{1}{2}$	60–88	98.7	−	+	○	..	....	....	4+	Pc2	$R_1\ b_1\ L_2\ b_2$
M., 31	Catarrhal	D	Quiescent	I	$R_1\ L_1$	8	Favor.	Unimpaired	158	...	64–82	98.6	..	+	..	Unli	mited	....	...	R. & L-cle	ar.

R = Patients having intensive rest treatment during first six weeks of residence.

No. Sex Age	Occupation Marital condition Onset		Condition	Extent of physical signs (Turban)		Duration of disease, months	General condition	Digestion	Weight		Range of pulse 7 days on admission 2 days on discharge	Av. max. temp. 7 days on admission 2 days on discharge	T. B.			Exercise in minutes	Complications	Tuberculin O. T. maximum dose or other treatment	Complement fixation	*X*-ray findings	
				Both lungs	Each lung				Actual	Standard			Previous	Admission—Discharge.	Residence					Both lungs	Each lung
6477 F., 46	Teacher, S Catarrhal	A	R. Mod. Adv. A.	I	L_2	372?	Favor.	Unimpaired	162	162	64–78	98.3	+	○	—	. .	. . . .	. . . .	4+	Pc3	R_2 b_0 L_2 b_1
		D	Quiescent	I	R L	374?	Favor.	Unimpaired	159¾	. . .	60–75	98.6	. .	—	. .	45	. . . .	. . . .	. . .	R. & L-stat.	
6478 M., 21	Salesman, S Pleuritic	A	R. Mod. Adv. A.	. . .	. . . .	27	Favor.	Unimpaired	135½	145	56–88	99.0	+	○	○	. .	. . . .	. . . .	○	Pc3	R_2 a_1 L_2 a_1
		D	Ap. Arrested	. . .	. . . .	32¼	Favor.	Unimpaired	150	. . .	70–88	98.7	. .	○	. .	60	. . . .	. . . .	. . .	R. & L-clear.	
6480 F., 20	Nurse-in-Training, S, Pleuritic	A	Suspected Tbc.	. . .	. . . .	5	Favor.	Unimpaired	189¾	137	60–88	97.9	○	—	○	. .	. . . .	. . . .	○	Pc1?	R_1? a_1 L_1? a_1
		D	Suspected Tbc.	. . .	. . . .	7	Favor.	Unimpaired	182	. . .	56–78	98.3	. .	—	. .	60	. . . .	O. T. 1/1	. . .	R. ? clear. L-	clear. pleurisy
6481 F., 39	Bookkeeper, S Pleuritic	A	R. Mod. Adv. A.	?I	R?$_1$ L_0	16?	Favor.	Unimpaired	102	146	64–88	98.2	○	—	○	. .	. . . .	. . . .	○	Pc3	R_3 b_1 L_1 a_0
		D	Ap. Arrested	. . .	. . . .	19½	Favor.	Unimpaired	109¾	. . .	77–80	98.0	. .	○	. .	45	. . . .	. . . .	. . .	R. & L-clear.	
6486 M., 21	Foreman, S Catarrhal	A	Non-Tbc.	. . .	. . . .	5	Favor.	Unimpaired	148½	142	64–84	98.2	○	○	○	. .	. . . .	. . . .	○	Pc1	R_1 b_1
		D	Non-Tbc.	. . .	. . . .	8	Favor.	Unimpaired	149¾	. . .	60–88	98.6	. .	○	. .	. .	. . . .	O. T. 1/1	. . .	R. & L-stat.	
6490 F., 38	Nurse, S Insidious	A	P.R. Minimal A.	I	L_1	8	Favor.	Unimpaired	161½	159¼	48–88	98.3	—	—	—	. .	. . . .	. . . .	○	Pc1	L_1 a_0
		D	Quiescent	. . .	. . . .	10	Favor.	Unimpaired	163½	. . .	52–76	98.7	. .	—	. .	60	. . . .	O. T. 1/1	. . .	R. & L-stat.	
6491 M., 34	Salesman, M Hemoptoic	A	R. Minimal A.	. . .	. . . .	3?	Favor.	Unimpaired	140	155	60–84	98.2	+	○	○	. .	. . . .	. . . .	○	Pc1	R_1 b_1 L_1? a_0
		D	Ap. Arrested	. . .	. . . .	6¾	Favor.	Unimpaired	150½	. . .	64–90	98.6	. .	○	. .	60	. . . .	. . . .	. . .	R-clear. L-st	at.
6493 M., 47	Office Bldg. Supt., M, Catarrhal	A	R. Minimal A.	. . .	. . . .	24	Favor.	Unimpaired	149¾	177	42–72	98.6	○	○	○	. .	. . . .	. . . .	○	Pc1	R_1 a_1
		D	Improved	. . .	. . . .	25¾	Favor.	Unimpaired	151	. . .	60–72	98.2	. .	○	. .	45	. . . .	O. T. 2/1	. . .	R. & L-stat.	
6495 F., 32	Teacher, S Insidious	A	Non-Tbc.	. . .	. . . .	24?	Favor.	Impaired	110½	142	60–92	98.3	—	○	○	. .	. . . .	. . . .	2+	Isolated tube	rcles
		D	Non-Tbc.	. . .	. . . .	26?	Favor.	Unimpaired	117	. . .	78–94	98.5	. .	○	. .	60	. . . .	O. T. 2/3	. . .	R. & L-stat.	
6496 M., 26	Clerk Grocer, S Hemoptoic	A	R. Minimal A.	I?	L_1?	60	Favor.	Unimpaired	118	136	62–88	98.5	—	—	○	. .	. . . .	. . . .	3+	Pc1	R_1 a_0 L_1 a_1
		D	Quiescent	. . .	. . . .	62⅓	Favor.	Unimpaired	120½	. . .	64–82	98.5	. .	○	. .	30	. . . .	. . . .	. . .	R-stat. L-cle	ar.
6498 F., 24	Chemist, M Laryngeal	A	P.R. Mod. Adv. A.	II	R_2	11	Favor.	Unimpaired	128¼	127	68–92	98.6	?	+	+	. .	Laryngitis	. . . .	○	Pt2	R_2 b_1 L_1 b_1
		D	Quiescent	II	R_3 L_1	15½	Favor.	Unimpaired	132	. . .	72–90	98.5	. .	+	. .	Un- li mited	Laryngitis	. . . .	. . .	R. & L-clear.	
6500 F., 24	Librarian, S Insidious	A	Non-Tbc.	. . .	. . . .	36	Favor.	Impaired	102½	123¼	76–108	98.8	—	○	○	. .	Bronchitis	. . . .	○	Pt1	R_1 a_1
		D	Non-Tbc.	. . .	. . . .	38	Favor.	Unimpaired	117	. . .	76–100	99.1	. .	○	. .	Unli mited	. . . . . .	O. T. 2/3	. . .	R. & L-stat.	
6501 M., 46	Salesman, S Catarrhal	A	(Bacilli +) Minimal A.	. .	. . . .	48	Favor.	Unimpaired	127	155	48–84	97.7	○	○	+	. .	. . . .	. . . .	○	Pc1?	L_1? a_1
		D	Ap. Arrested	. . .	. . . .	51	Favor.	Unimpaired	128¾	. . .	52–76	98.1	. .	○	. .	60	. . . .	O. T. 1/1	. . .	R. & L-stat.	

6503	Student, S	A	Non-Tbc.	..	....	15	Favor.	Unimpaired	112½	140	56–88	98.4	○	○	○	..	Spontaneous pneumothorax	....	○	Calcified tub	ercles
F., 20	Spontaneous pneumothorax	D	Non-Tbc.	...	....	17½	Favor.	Unimpaired	109¼	...	60–74	98.4	..	○	.. li	Un- mited	Enteroptosis	O. T. 1/1	...	R. & L-stat.	
6505	Student, S	A	Suspected Tbc.	...	....	3	Favor.	Unimpaired	114¼	127	64–92	98.2	+	○	○	..	....	....	○	Pt1	$R_1\ a_0$
F., 19	Catarrhal	D	Suspected Tbc. tbc. + prev.	...	....	7¼	Favor.	Unimpaired	113¼	...	70–80	98.5	..	○	..	Unli	mited	O. T. 2/5	...	R. & L-stat.	
6506	Medical Student, S	A	P. R. Mod. Adv. A.	I	R_1	15	Favor.	Unimpaired	184¼	160	60–100	98.5	+	○	○	..	....	....	○	Pc3	$R_2\ c_1\ L_1\ a_0$
M., 24	Tuberculous pneumonia R.	D	Quiescent	II	R_3	19	Favor.	Unimpaired	181	...	74–86	98.2	..	○	..	Unli	mited	....	...	R-clear. L-st	at.
6511	Registered Nurse, S	A	H Suspected Tbc.	...	....	9	Favor.	Unimpaired	135¼	129	68 96	99.0	?	—	—	..	....	....	○	Isolated tube	rcles
F., 22	Insidious	D	Suspected Tbc.	...	....	11½	Favor.	Unimpaired	131	...	80–96	99.2	..	—	..	60	....	....	...	R. & L-stat.	
6514	School Teacher, S	A	P. Suspected Tbc.	I	L	2	Favor.	Unimpaired	125¼	131½	70–92	99.0	—	—	—	..	....	....	2+	R pleurisy L	induratedglands
F., 29	Insidious	D	Suspected Tbc.	I	L	6	Favor.	Unimpaired	125½	...	68–80	98.6	..	—	..	30	....	O. T. 1/1	...	R-clear. pleu	risy L-stat.
6516	Probation Officer, S	A	Non-Tbc.	...	....	168	Favor.	Unimpaired	116½	154	60–100	98.0	—	—	—	..	Neurasthenia	....	4+	Pt1	$R_1\ a_0\ L_1\ a_0$
F., 42	Insidious	D	Non-Tbc.	I	L_1	169½	Favor.	Unimpaired	117½	...	66–76	99.0	..	—	..	15	Neurasthenia	O. T. 2/1	...	R. & L-stat.	
6521	Reporter, M	A	R. Minimal A.	...	....	3	Favor.	Unimpaired	155¼	157	56–96	98.3	—	○	○	..	....	....	○	Pc1	$L_1\ b_1$
M., 32	Hemoptoic	D	Ap. Arrested	...	....	6½	Favor.	Unimpaired	163¾	...	67–80	98.6	..	○	..	Unli	mited	Ultra-violet ray	...	R-stat. L-cle	ar.
6523	Stenographer, S	A	R. Minimal A.	...	....	36	Favor.	Unimpaired	83	124½	68–100	98.6	—	—	—	..	Asthma	....	○	Pc2	$R_1\ a_1\ L_1\ a_1$
F., 22	Insidious	D	Ap. Arrested	II	L_2	39	Favor.	Unimpaired	95¾	...	68–110	98.8	..	—	.. li	Un- mited	Asthma	....	...	R. & L-stat.	
6525	Telephone Oper., S	A	R. Mod. Adv. A.	I	R_1	3	Favor.	Unimpaired	105¾	119	72–104	98.5	—	○	—	..	....	....	4+	Pc3	$R_3\ b_1\ L_1\ a_1$
F., 17	Hemoptoic	D	Quiescent	I	R	6¼	Favor.	Unimpaired	99	...	78–104	98.7	..	○	..	..	....	....	...	R. & L-stat.	
6526	Housewife, M	A	R. Minimal A.	...	....	29	Favor.	Unimpaired	129	150	68–92	99.0	○	○	○	..	Neurasthenia	....	○	Pc1	$R_1\ a_0$
F., 42	Insidious	D	Improved	...	....	30¾	Favor.	Unimpaired	139½	...	80–104	99.1	..	○	..	45	Neurasthenia	....	...	R. & L-stat.	
6527	Hospital Supt., S	A	R. Mod. Adv. A.	I	L_1	48	Favor.	Unimpaired	149½	153¾	64–92	98.2	+	○	○	..	....	....	○	Pc3	$R_1\ a_1\ L_3\ b_1$
F., 29	Pleuritic c effusion	D	Quiescent	I	L	51	Favor.	Unimpaired	159¼	...	70–88	98.6	..	—	..	60	....	....	...	R-stat. L-cle	ar.
6531	Steward, M	A	R. Mod. Adv. A.	II	$R_1\ L_1$	36	Favor.	Unimpaired	154	159	60–80	98.4	○	○	+	..	....	....	○	Pc3	$R_3\ c_2\ L_3\ b_1$
M., 42	Catarrhal	D	Unimproved	II	$R_2\ L_2$	39	Favor.	Unimpaired	172¾	...	90–92	97.7	..	+	..	10	....	....	...	R-inc. & ? cle	ar. L-inc.
6568	Clerk, S	A	Non-Tbc.	...	....	18	Favor.	Unimpaired	135½	131½	72–100	98.9	—	—	—	..	Pulmonary infection ?	....	○	Pc1	$R_1\ a_0$
F., 41	Insidious	D	Non-Tbc.	...	....	19¼	Favor.	Unimpaired	134	...	76–86	98 7	..	—	..	..	Pulmonary infection ?	O. T. 2/3	...	R. & L-stat.	
6573	Student, S	A	R. Minimal A.	...	....	33	Favor.	Impaired	113¾	130	84–108	98.3	—	○	—	..	....	....	○	Pc1	$R_1\ b_1$
F., 23	Insidious	D	Unimproved	...	....	34	Favor.	Unimpaired	112	...	72–82	98.2	..	—	..	15	....	....	...	R. & L-stat.	

R = Patients having intensive rest treatment during first six weeks of residence.

SUMMARY

Class	Extent of physical signs according to Turban	T. B. found at any time	Hygienic-dietetic treatment of patients who stayed over 90 days. Average residence, 212 days.					
			Cases	App. arr.	Quiescent	Impr.	Unimproved	Died
Minimal (incipient) 28	O	O	12	9	2	..	1	..
	O	+	7	7	..	..	..	..
	I	O	5	4	1	..	..	..
	I	+	4	1	2	1	..	..
Moderately advanced 151	O	O	11	6	5	..	..	..
	O	+	29	18	8	1	2	..
	I	O	14	2	12	..	..	..
	I	+	41	3	30	3	5	..
	II	O	6	..	6	..	..	..
	II	+	45	1	29	5	10	..
	III	O	1	..	1	..	..	..
	III	+	4	1	3	..	..	..
Far advanced 30	O	O	..	..	..	..	..	..
	O	+	3	2	1	..	..	..
	I	O	1	..	1	..	..	..
	I	+	5	..	1	2	..	2
	II	O	..	..	..	..	..	..
	II	+	8	..	3	3	2	..
	III	O	1	..	1	..	..	..
	III	+	12	..	5	3	4	..
Total	....	..	209	54	111	18	24	2

NOTE.—There were also 28 patients who stayed 90 days or less, 11 suspected tuberculosis, 17 non-tuberculous and 1 demonstrable non-clinical tuberculosis cases.
In this summary, cases which had tuberole bacilli in the sputum previous to admission are counted +, as well as those which had tuberole bacilli at any time during residence.
Questionable physical signs are included with negative Turban.

RESULTS OF SPUTUM EXAMINATIONS OF ABOVE PATIENTS

Class	Turban	Cases	A R D + + +	A R D + + O	A R D + O +	A R D + O O	A R D O + +	A R D O O +	A R D O + O	A R D O O O	P A R D + O O O
Minimal 28	O	19	..	..	..	..	..	..	4	12	3
	I	9	..	1	..	1	..	..	1	5	1
	II	..	..	..	..	..	..	..	..	..	..
Moderately advanced 151	O	40	3	4	..	1	2	..	2	11	17
	I	55	8	7	2	6	3	2	5	14	8
	II	51	15	8	2	..	3	1	2	6	14
	III	5	..	1	..	..	1	..	1	1	1
Far advanced 30	O	3	..	..	..	..	..	1	1	..	1
	I	6	2	1	..	..	..	1	1	1	..
	II	8	3	1	..	..	2	1	..	..	1
	III	13	8	2	1	..	..	..	1	1	..
Total	....	209	39	25	5	8	11	6	18	51	46

NOTE.—O = Tubercle bacilli absent. + = Present. A = Admission. R = During residence. D = On discharge. P = Previous to admission.
When tubercle bacilli were present, no note is made with regard to previous examinations.
When tuberole baoilli were present previous to admission, and also at any time during residence, they are marked as present on admission.
Questionable physical signs are included with negative Turban.

REPORT OF THE PATHOLOGIST OF THE SARANAC LABORATORY FOR THE STUDY OF TUBERCULOSIS FOR THE YEAR ENDING DECEMBER 1, 1924

LEROY U. GARDNER, M.D., Pathologist

THE major portion of the time of the staff of the laboratory has been devoted to the investigation of various problems in tuberculosis, both clinical and others more theoretical in nature. Dr. Willard B. Soper has been conducting an investigation of tuberculous meningitis with special reference to superinfection. A paper is now in press. Dr. Edgar Mayer is continuing his studies on the action of ultraviolet quartz light radiation upon tuberculosis and tuberculous lesions, and has published a series of papers. Mr. Morris Dworski, in addition to his duties as clinical pathologist and chemist, has assisted in both these investigations and in various phases of the studies on dust inhalations being conducted by the pathologist. Clinical pathological studies have been made upon autopsy material from 14 cases treated by artificial pneumothorax, and a paper on this subject has been accepted for publication. Investigation of the action of mercury quartz light radiation upon intestinal tuberculosis has been started and a preliminary report on 32 cases carefully studied has been made before the Saranac Lake Medical Society. Mr. Hulpritt, the bacteriologist, is investigating the character of acid-fast organisms, non-pathogenic for guinea-pigs, found in the urine. Dr. C. H. Haskins has recently been assigned by the United States Veterans Bureau to the Saranac Laboratory. His time will largely be devoted to improving the demonstration material for the Trudeau School.

During the year 4220 specimens of various nature have been examined by the members of the staff. These examinations have been made for the local physicians, hospitals and sanatoriums and for the United States Veterans Bureau. Some work has been done in Lake Placid and in various summer resorts in this vicinity. In the following table the general character of the work is indicated:

TABULATION OF EXAMINATIONS

Animal inoculation for diagnosis	70
Autopsies	12
Bacteriological examinations:	
Blood cultures	14
Diphtheria cultures	43
Gonococcus smears	7
Pleural fluids	19
Miscellaneous	16
Sputa:	
Direct smears for Bacillus tuberculosis	1994
General bacteriological examination	6
Vaccines, autogenous	12
Spinal fluids	13
Blood counts	250
Blood sugars	3
Blood typing	4
Malaria searches	2
Widal tests	16
Feces	19
Milk, plate counts	15
Stomach contents	2
Urine, chemical and microscopical	1630
Surgical specimens	57
Vincent's angina smears	5
Water analysis, bacteriological	11
Total examinations	4220

The various specimens submitted for histological examination may be grouped as follows:

Appendices:	
From tuberculous patients with tuberculosis of appendix	2
From tuberculous patients without tuberculosis of appendix	14
From non-tuberculous patients without tuberculosis of appendix	5
Tumors:	
Benign	9
Malignant	5
Tuberculosis in various organs:	
Cervical lymph nodes	1
Epididymis	2
Kidney	1
Rectal fistula	1
Testis	1
Tube and ovary	1
Miscellaneous	15
Total	57

Autopsy Material: Of the bodies autopsied, the cause of death was chronic pulmonary and intestinal tuberculosis in 9. These have been of interest in furnishing further material for the study of the lesions of intestinal tuberculosis. Including these cases and 23 from previous years, a total of 32 cases on which very careful gross and microscopic examination, the latter often by serial section, is now available. Summarizing this material briefly it may be stated that gross and microscopic evidence of healing has been observed in 13 instances. Of these, 11 had been under treatment with artificial heliotherapy for periods varying from a few weeks to four years; 1 had received no specific therapy, and 2 had previously been operated upon for the condition three months and one year respectively. In them the remaining areas were presumably foci of minimal disease. No deductions are permissible from such a small series of cases but it seems very probable that further study will demonstrate an increased incidence of healing in those patients receiving artificial heliotherapy.

Four individuals died from causes other than tuberculosis. One with extensive pulmonary and intestinal tuberculosis had been receiving over a considerable period of time intravenous injections of 5 per cent or 10 per cent calcium chloride. After the last injection death occurred within twelve hours, and autopsy demonstrated a venous thrombosis especially marked in the great veins of the head. In another individual, death was caused by an accidental gun-shot wound, and a third, in whom there were marked evidences of extensive healed pulmonary tuberculosis, was the victim of carcinoma of the prostate with giant metastases in the liver.

The following table indicates the principal anatomical diagnoses in the various cases:

A–24–1. Chronic pulmonary and intestinal tuberculosis. Cause of death: Venous thrombosis and œdema of the brain following intravenous administration of calcium chloride.
A–24–2. Chronic pulmonary tuberculosis. Cause of death: A diffuse necrotizing process in the entire alimentary tract, of undetermined origin.
A–24–3. Chronic pulmonary and intestinal tuberculosis.
A–24–4. Chronic pulmonary and early intestinal tuberculosis. Postoperative death two weeks after the second stage of a thoracoplasty.
A–24–5. Gunshot wound of the head.
A–24–5x. Bronchopneumonia with pulmonary abscess; metastatic brain abscess.
A–24–6. Chronic pulmonary tuberculosis and healed intestinal tuberculosis.
A–24–7. Chronic pulmonary tuberculosis and intestinal tuberculosis; acute miliary tuberculosis.
A–24–8. Chronic pulmonary tuberculosis and healing intestinal tuberculosis.
A–24–9. Chronic pulmonary tuberculosis and healing intestinal tuberculosis.
A–24–10. Healed pulmonary tuberculosis; carcinoma of the prostate with massive metastasis in the liver.
A–24–11. Chronic pulmonary tuberculosis; acute tuberculous mediastinitis, with esophageal fistula.

PRESENT CONDITION OF ALL PATIENTS

Condition on admission	Condition at discharge	Condition on anniversary of discharge for year ending Oct. 31, 1924	Total cases		Discharged during the year ending October 31																																							Last 10 yrs.	
			No.	%	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	No.	%
Minimal (incipient) 1697= 29.12%	Apparently arrested 779= 13.37%	Well	529	9.08	..	1	1	..	..	2	3	2	6	2	4	6	9	11	15	18	12	20	22	22	22	29	17	14	24	21	16	18	20	26	28	24	14	14	26	16	17	18	9	192	8.93
		Living*	60	1.08	..	..	..	..	..	..	3	..	2	1	1	..	3	2	5	3	5	4	..	..	3	..	1	1	6	2	..	1	2	3	2	1	2	1	2	2	..	1	1	15	.70
		Dead	121	2.08	..	1	1	2	4	2	..	2	3	2	3	5	9	7	11	9	6	6	8	2	6	3	4	6	1	1	2	4	2	..	2	..	4	1	..	1	..	..	1	9	.42
		Unknown	69	1.18	1	..	2	2	3	4	3	..	..	..	3	2	2	3	2	1	5	3	6	5	2	2	1	..	..	3	..	2	..	1	1	3	2	..	2	1	1	1	..	12	.56
	Quiescent 600= 10.29%	Well	354	6.07	..	..	..	..	..	..	..	..	3	2	1	5	2	..	3	6	8	4	12	14	26	20	24	17	18	14	23	16	20	5	21	14	10	14	17	14	5	8	8	116	5.39
		Living*	57	.98	..	..	..	1	..	..	..	..	..	..	..	..	2	1	..	..	..	1	2	2	2	3	1	3	5	2	2	4	4	2	4	2	3	..	2	6	1	2	..	22	1.02
		Dead	157	2.69	..	..	..	..	1	2	2	..	2	2	3	5	7	4	7	8	7	5	5	10	14	15	5	4	4	4	4	2	..	4	7	8	8	3	2	2	1	..	..	35	1.63
		Unknown	32	.55	..	..	1	2	..	..	..	..	2	1	..	1	..	2	..	..	..	1	4	3	2	2	1	..	4	1	..	1	..	..	1	3	..	..	..	..	..	..	..	4	.18
	Active 318= 5.46%	Well	173	2.97	..	..	..	..	..	..	..	2	..	1	2	..	..	1	1	..	2	4	2	4	8	4	12	13	8	7	11	18	13	7	15	12	9	7	2	4	..	3	1	60	2.79
		Living*	33	.57	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	1	..	..	..	..	4	1	2	4	1	2	1	3	2	3	1	1	2	2	1	..	16	.74
		Dead	86	1.48	..	..	..	1	..	2	3	..	3	..	1	..	2	5	4	1	2	..	3	3	3	3	5	4	1	..	2	3	6	6	5	8	..	3	4	3	..	..	..	29	1.35
		Unknown	26	.44	1	..	1	..	..	..	..	..	..	..	..	1	..	1	1	..	1	..	..	1	1	1	..	..	4	3	1	..	3	1	3	1	..	..	..	..	..	1	..	6	.27
Moderately advanced 3665= 62.87%	Apparently arrested 396= 6.79%	Well	252	4.32	..	..	1	..	..	..	1	3	2	3	3	3	4	4	4	10	4	9	8	7	3	5	3	2	5	6	6	7	8	22	6	5	16	10	5	9	25	22	21	141	6.55
		Living*	26	.45	..	..	..	..	..	..	1	..	..	..	..	..	..	1	1	..	1	..	..	..	..	..	..	..	..	..	1	1	..	..	..	2	2	4	2	1	7	1	1	20	.93
		Dead	82	1.41	..	1	1	1	1	5	1	2	..	3	4	1	2	7	7	6	4	3	3	2	1	2	3	3	1	1	2	1	2	3	1	..	1	1	2	2	2	..	..	12	.56
		Unknown	36	.61	..	..	..	4	1	5	1	1	..	..	..	2	..	4	..	2	..	..	1	3	1	..	..	..	1	3	..	1	..	..	..	..	..	1	..	1	..	..	4	6	.28
	Quiescent 2018= 34.62%	Well	1053	18.07	..	..	..	..	..	..	..	1	1	2	2	7	2	9	5	11	16	16	23	23	25	23	32	46	34	48	41	46	47	48	34	44	69	53	55	56	70	83	81	593	27.57
		Living*	171	2.93	..	..	..	..	..	..	1	1	..	..	..	1	..	1	2	1	1	..	1	9	4	5	5	6	2	9	3	5	7	5	6	4	7	9	17	14	13	20	12	107	4.97
		Dead	697	11.96	1	..	1	2	12	6	18	9	12	9	22	16	26	16	23	50	44	38	41	41	27	21	20	17	27	34	24	19	14	20	16	18	17	12	13	4	3	3	1	107	4.97
		Unknown	97	1.66	..	..	1	1	4	2	2	..	5	..	3	2	..	..	3	3	2	2	..	5	1	3	4	1	4	3	4	3	1	6	4	5	8	5	2	2	2	..	4	38	1.77
	Active 1251= 21.46%	Well	295	5.06	..	..	..	..	1	1	1	1	..	1	1	1	2	4	2	..	4	6	3	4	1	2	13	8	8	16	15	15	16	16	13	17	23	26	10	19	10	22	13	169	7.86
		Living*	105	1.80	..	..	..	..	..	..	..	..	1	..	..	..	..	..	2	1	..	1	..	1	..	..	2	3	2	1	2	5	4	4	4	9	5	9	12	10	8	6	13	80	3.72
		Dead	758	13.00	1	11	7	6	8	20	21	30	21	15	27	22	34	26	35	23	20	28	36	19	24	19	15	15	23	22	25	18	30	26	18	21	24	18	18	12	10	8	2	157	7.30
		Unknown	93	1.60	2	9	8	11	5	3	5	5	..	2	2	3	3	2	3	..	..	1	..	..	..	1	..	1	..	4	..	3	..	1	1	3	3	2	3	..	2	2	3	20	.93
Far advanced 467= 8.01%	Apparently arrested 5= 0.09%	Well	4	.07	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	1	4	.18
		Living*	1	.02	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	.05
		Dead	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	....
		Unknown	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	....
	Quiescent 112= 1.92%	Well	42	.72	..	..	..	..	..	..	..	..	1	..	..	2	..	2	..	..	..	..	..	..	..	..	..	..	..	2	..	..	1	3	1	..	1	2	2	5	2	7	11	34	1.58
		Living*	8	.14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	2	..	..	..	3	1	1	7	.33
		Dead	57	.98	..	..	..	..	2	..	..	4	1	4	3	7	2	1	5	2	3	1	..	..	..	..	..	..	3	..	..	..	..	..	..	1	1	6	1	4	5	1	..	19	.88
		Unknown	5	.08	..	..	..	1	2	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	.05
	Active 350= 6.00%	Well	41	.70	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	1	..	..	..	..	..	..	..	1	..	..	1	..	..	..	2	..	1	..	3	7	5	8	10	36	1.67
		Living*	24	.41	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	1	..	5	5	3	8	24	1.12
		Dead	269	4.62	..	2	3	4	7	17	8	15	16	14	15	13	18	13	16	10	16	4	2	2	..	1	2	2	3	1	3	2	2	5	7	7	4	7	4	16	2	4	2	58	2.70
		Unknown	16	.27	..	..	1	5	1	2	1	..	..	1	1	1	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	.05
Summary	App. arr. 1180= 20.25% quiescent 2730= 46.83% Active 1919= 32.92%	Well	2743	47.06	..	1	2	..	1	3	5	9	13	11	14	24	19	32	30	46	46	59	70	74	85	83	101	101	97	114	113	120	125	127	120	116	143	126	120	130	137	171	155	1345	62.53
		Living*	485	8.32	..	..	..	1	..	..	5	1	3	1	1	1	5	5	11	6	7	6	4	12	9	8	9	17	16	16	12	17	20	16	19	21	24	25	36	40	39	35	37	292	13.57
		Dead	2227	38.20	2	15	13	16	35	54	53	62	58	49	78	69	100	79	108	109	102	85	98	79	75	64	54	51	63	63	62	49	56	64	56	63	59	51	44	44	23	16	6	426	19.81
		Unknown	374	6.42	4	9	14	26	16	16	13	6	7	4	9	12	6	12	9	6	8	7	11	17	7	10	6	2	13	17	5	10	4	9	10	15	13	8	7	4	5	5	12	88	4.09
Total	....	....	5829	100.00	6	25	29	43	52	73	76	78	81	65	102	106	130	128	158	167	163	157	183	182	176	165	170	171	189	210	192	196	205	216	205	215	239	210	207	218	204	227	210	2151	100.00

* "Living" does not include "well." This table does not include 342 suspected and non-tuberculous cases, nor 62 patients who died in the institution (1 suspected and 1 non-tuberculous)

Reprinted from The American Review of Tuberculosis
Vol. IX, No. 5, July, 1924

THE VALUE OF THE TRUDEAU SANATORIUM'S FIVE DIAGNOSTIC CRITERIA OF PULMONARY TUBERCULOSIS IN NEGATIVE DIAGNOSES

A STUDY OF 264 CASES ADMITTED TO THE SANATORIUM, DIAGNOSED AS NONTUBERCULOUS AND FOLLOWED UP FROM ONE TO SEVEN YEARS

LAWRASON BROWN and FRED H. HEISE

Many of the negative diagnoses made at the Trudeau Sanatorium have recently been called into question elsewhere. An attempt has therefore been made in this paper to estimate the correctness of such diagnoses as based on the criteria worked out at the Trudeau Sanatorium.

In a previous paper (1) statistical data were given substantiating the belief in the value of these five criteria of diagnosis, which are as follows: (1) the history of an hemoptysis of a teaspoonful or more, (2) the occurrence of pleurisy with effusion, (3) the presence of persistent moderately coarse râles in the upper half of the chest, (4) a definite parenchymatous X-ray lesion of a tuberculous character in the upper half of the chest and (5) tubercle bacilli in the sputum. Neither the hemoptysis, especially when small, nor the pleuritic effusion should have occurred during an epidemic of acute respiratory disease, nor be obviously the result of some other cause. The râles should have an underlying parenchymatous X-ray change of a tuberculous nature.

In another paper (2) were presented statistical data on the value of the absence of a constitutional or focal reaction, as seen in the X-ray, after the subcutaneous administration of a repeated dose of 10 mgm. of old tuberculin. Briefly, it may be stated as our belief that, when a patient has no definite evidence of pulmonary tuberculosis and has no tubercle bacilli in his sputum and, in the absence of contraindicating conditions prohibiting the test, he fails to react to tuberculin given in the manner stated, a negative diagnosis of pulmonary tuberculosis can safely be made. When the X-ray evidence of tuberculosis is slight and contraindications to the test are absent, an increase of shadow (congestion) around the focus, as seen in the X-ray plate, and following reaction to the test, should lead to a positive diagnosis and should indicate potentially active disease.

When none of the five criteria was present, pulmonary tuberculosis was said to be excluded. When an hemoptysis occurred under the conditions mentioned, or when a pleuritic effusion occurred as stated, and no further evidence could be found, a diagnosis of "suspected" pulmonary tuberculosis was made. When both occurred, a positive diagnosis was made. Râles not substantiated by X-ray or other evidence called only for a diagnosis of "suspected" pulmonary tuberculosis. A parenchymatous X-ray, when unaccompanied by symptomatic evidence of activity of the disease, led to a diagnosis of "nonclinical" pul-

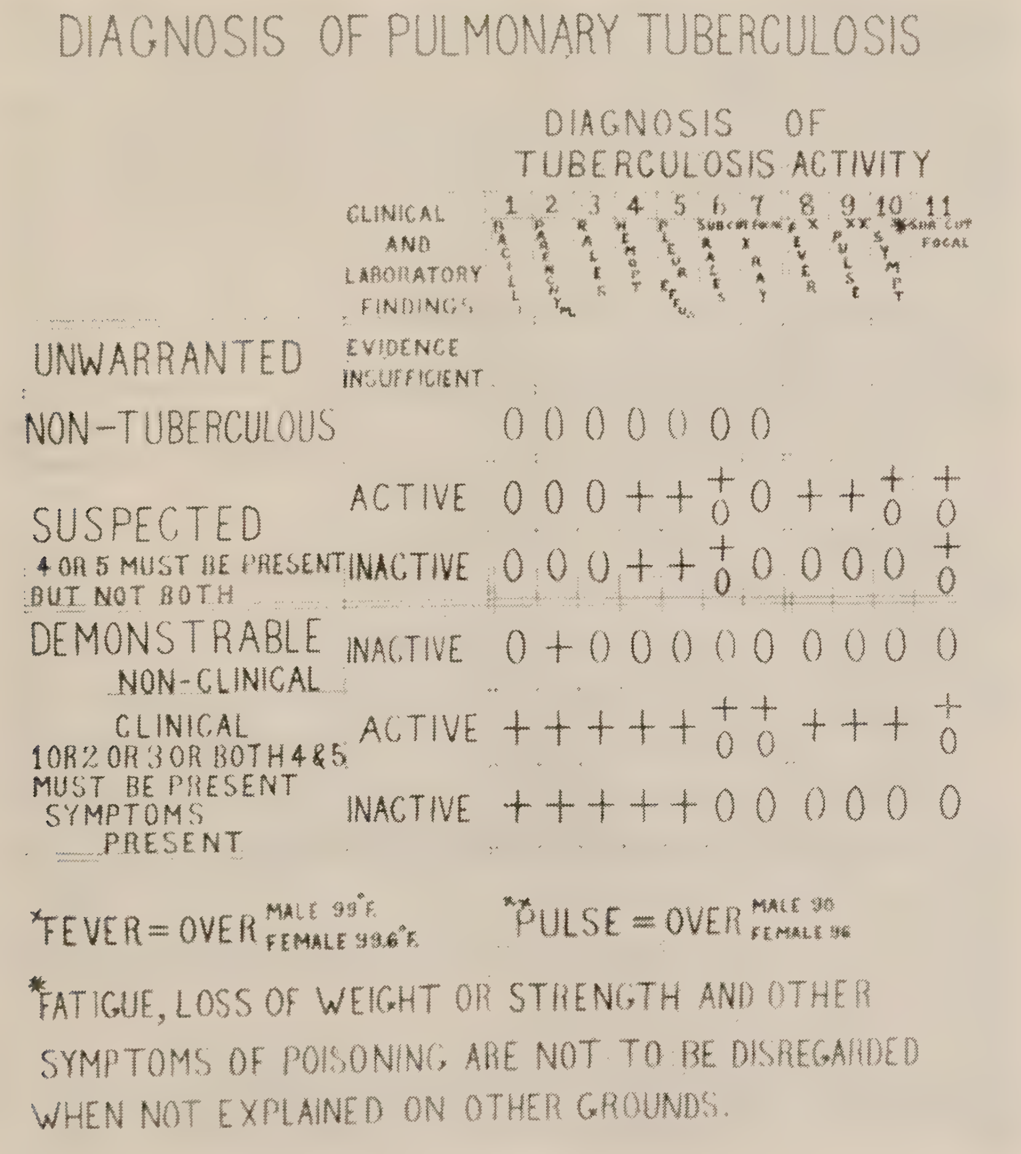

Chart 1. The Five Diagnostic Criteria and Their Significance in the Diagnosis of Clinical Activity

monary tuberculosis. Tubercle bacilli found in the sputum only before entrance to the Sanatorium, and not corroborated by evidence of disease such as physical signs, X-ray, hemoptysis or pleuritic effusion, led only to a diagnosis of "suspected" pulmonary tuberculosis.

Subjective symptoms, such as elevation of temperature, increased rapidity of pulse, gradual loss of weight, fatigue and languor, were used as a basis for diagnosis of the activity of the disease and not of the disease itself.

From 1916 to 1923 approximately 2,000 patients have been discharged from the Trudeau Sanatorium. Clinical pulmonary tuberculosis was found to exist in 1,725 and nonclinical pulmonary tuberculosis in 11. The diagnosis remained somewhat in doubt in 61 and a negative diagnosis was made in 203. An analysis of these cases and of their subsequent history has been made to determine in a way the correctness of the diagnoses.

1. THE NONTUBERCULOUS GROUP

Included in this group were the following: one case each of pulmonary abscess, frontal sinus infection, bronchiectasis, periapical infection of all teeth, ovarian cyst, renal calculus, nephritis, gall stones, post-poliomyelitis paralysis, arthritis deformans with psoriasis, probable Raynaud's disease, rheumatism with purpura, mitral regurgitation, endocarditis, tonsillitis and tuberculous tonsils removed previously; 2 cases of malignant tumor of the lung: 4 of enteroptosis (relieved by belt, etc.); 4 of syphilis; 5 of thyroid disorders; 12 of bronchitis; 13 post-influenzal; 21 with various nervous disorders; and 126 in which disability was not diagnosed.

Temporary râles were heard as follows: *1. Moderately coarse at an apex;* in one case of "thyroid," 3 of "nervous disturbances" and 3 with "disability not diagnosed." *2. Moderately coarse in the central portion of a lung;* in 1 case of "post-influenzal disability." *3. Moderately coarse at a base:* in 4 cases of bronchitis, 3 of "post-influenzal disability," one of "nervous disturbance," one of bronchiectasis and 6 with "disability not diagnosed." *4. Moderately coarse at an apex and a base:* in one case of endocarditis and one of bronchitis. *5. Fine at an apex:* in 2 cases of "enteroptosis," one of "nervous disorder" and one with "disability not diagnosed." *6. Fine at a base:* in one of syphilis, 2 of bronchitis and four with "disability not diagnosed." *7. Fine at an apex and a base:* in one with "disability not diagnosed."

Persistent râles were heard in the two cases of malignant tumor, one of bronchitis and one "post-influenza." The two cases of malignant tumor also showed parenchymatous changes in the X-ray atypical of tuberculosis. Atypical X-ray changes were also seen in the cases of pulmonary abscess, mitral regurgitation and in one of the "disability not diagnosed."

The patient with rheumatism and purpura died within a year of endocarditis, the one with gall stones died of influenza within a year. One patient with malignant tumor died of carcinoma of the lung within a year, the other died of Hodgkin's disease within three years. One "disability not diagnosed" case died of endocarditis after five years. Twenty had left the Sanatorium for less than a year. All others have remained well from one to seven years with the following exceptions: one syphilis case had hemoptysis and elevation of temperature after two years, and two cases with "disability not diagnosed" had hemoptysis without other symptoms after one and three years, respectively, and are now well.

The subcutaneous tuberculin test was given to 159 patients. Sixty-four failed to react either constitutionally or focally to a repeated dose of 10 mgm. O. T., while one reacted constitutionally but not focally to 10 mgm. O. T. All others reacted constitutionally to various other smaller doses. Focal reactions were noted by physical signs only as follows: the one case each of sinus disease, periapical infection of teeth and post-poliomyelitis paralysis, one case of post-influenza, two of nervous disorders, two "disability not diagnosed." In all these instances fine râles were noted and the likelihood of error was borne in mind.

None of the 203 cases has developed demonstrable pulmonary tuberculosis unless the occurrence of hemoptysis in the three patients (1.5 per cent) may be regarded as such without further evidence. It must be borne in mind that all of these patients had been sent to the Trudeau Sanatorium with a positive diagnosis of pulmonary tuberculosis.

2. THE SUSPECTED GROUP

In this group of 61 cases were included one case each of aspergillosis, suspected malignant tumor of the lung, tuberculous rib, colitis, post-pneumonic disability, suspected bronchiectasis, bronchitis with thyroid disturbances, spontaneous pneumothorax and mitral regurgitation;

2 cases each with thyroid disturbance, suspected syphilis, cervical adenitis and bronchitis; 10 cases with nervous disorders and 34 cases in which disability was not diagnosed.

Temporary râles occurred as follows: *1. Moderately coarse at an apex:* in one patient whose disability was not diagnosed. *2. Moderately coarse at a base:* in one case of bronchitis and two with "disability not diagnosed." *3. Moderately coarse at an apex and a base:* in one case of bronchitis with thyroid disturbance. *4. Moderately coarse in the centre of a lung:* in one case of mitral regurgitation. *5. Fine at an apex:* in 4 cases with "disability not diagnosed." *6. Fine at a base:* in one case with "disability not diagnosed." *7. Fine at an apex and a base:* in one case with "disability not diagnosed."

Persistent râles were found as follows: in one case of bronchiectasis with fine râles at a base, in one of bronchitis with moderately coarse râles at an apex and a base, in two of bronchitis with moderately coarse râles at a base, in one with "disability not diagnosed" with fine râles at the apex and in one with moderately coarse râles at an apex, and in one with fine râles at an apex and moderately coarse râles at the base.

Parenchymatous X-ray changes, slight in intensity and extent and atypical of tuberculosis, were noted in the following cases: one of aspergillosis, one of suspected malignant tumor, one with thyroid disturbances, two of bronchitis, one of cervical adenitis (X-ray changes at the base), one of neurasthenia and 5 with "disability not diagnosed."

Eleven cases gave a history of positive sputum, 3 of a previous wet pleurisy and 16 of a previous hemoptysis.

The subcutaneous test was given to forty-four. Fifteen failed to react to a repeated dose of 10 mgm. O. T. Twenty-nine reacted constitutionally and 13 focally as determined by physical signs. None reacted focally as seen in the X-ray plate.

Nine were discharged less than one year ago. The patient with probable malignant tumor of the lung died within a year of bronchopneumonia. All others remained well from one to seven years except as follows: The patient with a tuberculous rib developed wet pleurisy within a year, and hemoptysis and fever within two years. He has had a demonstrable pulmonary tuberculosis with positive sputum but is now arrested. One case of cervical adenitis with basal parenchymatous changes developed an apical parenchymatous X-ray change within two years and has now a definite quiescent pulmonary tuberculosis.

3. THE NONCLINICAL GROUP

Eleven cases were classified as nonclinically tuberculous. One had bronchitis due to some form of sensitization, one an antrum infection following influenza and 9 had no other diagnosed disability. The 2 first-mentioned cases had temporary moderately coarse râles at the base and slight parenchymatous changes at the apex. One of the "disability not diagnosed" cases had temporary moderately coarse râles at the apex. Seven "disability not diagnosed" cases had slight parenchymatous changes at the apex and two had them in the central portion of the lung. All eleven were given the subcutaneous test. Three failed to react to a repeated dose of 10 mgm. of O. T. All others reacted to various smaller doses constitutionally, but not focally as determined by physical signs or X-ray. Seven have been discharged less than a year; the others have remained well from two to three years and have developed no active tuberculosis.

DISCUSSION AND SUMMARY

Of 203 nontuberculous cases admitted to Trudeau Sanatorium, 126 had no recognizable clinical disability. Of the 77 who were found to have a definite reason for disability, some form of nervous disturbance was found to be the most frequent cause (21 instances). Disability in these instances was manifested principally by languor, loss of weight, anorexia, etc. Next in order of frequency were the post-influenzal debilities (13 cases). For the most part these had the usual temporary symptoms of bronchitis accompanied by languor, etc. A few had a more lasting bronchitis. Bronchitis of unknown origin occurred twelve times. Thyroid disturbances occurred in 5, syphilis in 4, enteroptosis in 4, malignant tumor of the lung in 2 and in one instance each the following conditions were found,—frontal sinus infection, periapical infection of all teeth, tonsillitis, tuberculous tonsils (removed previously), pulmonary abscess, bronchiectasis, endocarditis, mitral regurgitation, rheumatism with purpura, Raynaud's disease or arthritis, arthritis deformans with psoriasis, nephritis, renal calculus, gall stones, post-poliomyelitis paralysis, ovarian cyst.

In 126 cases no definite disability was diagnosed. A large proportion had "colds" or were run down from lack of physical rest. Recuperation followed closely upon taking such rest.

From the above it would seem that too much importance is placed upon the toxic symptomatology in diagnosing tuberculosis rather than upon the activity of the disease when its presence is assured by other methods. Furthermore, too great an importance is placed upon the clinical findings at one examination. It frequently takes time to diagnose pulmonary tuberculosis. It cannot always be done at one examination, and repeated observation and examinations are often necessary.

From a survey of the "suspected" group it can also be said that a diagnosis cannot always be made definitely, with justice to the patient, even after prolonged examination. Other conditions may be present at the same time as the pulmonary tuberculosis or they may closely simulate it. It is most difficult at times to draw the dividing line between presence and absence of this disease; the patient should be protected physically as well as socially. The easiest thing to do from the standpoint of the physician is to say that tuberculosis is present.

It is gratifying to know that only 2 of 264 suspected or negative cases developed definite pulmonary tuberculosis (0.75 per cent), but both of these were known, however, to be tuberculous. All 3 definite or questionable cases of malignant tumor of the lung are dead, the causes of death having been carcinoma of the lung, Hodgkin's disease and bronchopneumonia. Four patients with definite and 2 with probable syphilis are living and well from four to seven years after discharge. Three with definite syphilis failed to react to a repeated subcutaneous dose of 10 mgm. O. T. The other three had no subcutaneous tuberculin test.

THE SUBCUTANEOUS TUBERCULIN TEST

This test was given to 214 patients: 82 failed to react to a repeated dose of 10 mgm. O. T.; 132 reacted constitutionally and of these, 21 reacted focally as determined by physical signs. Forty per cent of the nontuberculous, 34 per cent of the "suspected" and 27 per cent of the "nonclinical" failed to react. Temporary fine râles were found immediately after the constitutional reactions in 12.5 per cent of the nontuberculous, 29.5 per cent of the "suspected" and none of the "nonclinical" cases.

CONCLUSIONS

1. It must always be borne in mind that definite clinical pulmonary tuberculosis may develop at any time in a certain number of subliminal cases.
2. It is unwise to accept from one year to another a negative diagnosis of clinical pulmonary tuberculosis although in these cases the percentage is so small as to be almost negligable.
3. A patient who fails to react to a repeated dose of 10 mgm. of old tuberculin rarely, if ever, develops active clinical pulmonary tuberculosis.
4. When all of the five suggested diagnostic criteria are absent a negative diagnosis of clinical pulmonary tuberculosis can be safely made.

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Reprinted from The American Review of Tuberculosis
Vol. IX, No. 5, July, 1924

AN ATTEMPT TO CLASSIFY BY MEANS OF THE X-RAY CASES OF SUSPECTED AND DEFINITE PULMONARY TUBERCULOSIS SHOWING LESS THAN A DEFINITE PARENCHYMATOUS X-RAY LESION[1]

A Preliminary Report

FRED H. HEISE and HOMER L. SAMPSON

Almost every diagnostician encounters, at times, cases in which no more definite evidence of pulmonary tuberculosis presents itself than the history of an hemoptysis or of tubercle bacilli having been found in the sputum or of a previous wet pleurisy in which no definite lesion can be seen in the X-ray plate. It was hoped that in this type of case something could be gained by a more critical study of the X-ray plates and be of aid in diagnosis. Accordingly, a small number of cases were selected from each of the following groups: (1) nontuberculous, (2) those with a history of hemoptysis, (3) those with a history of pleurisy with effusion, (4) those whose sputum was reported as previously positive and (5) those presenting a combination of two or more of the findings under *(2)* *(3)* and *(4)*. The X-ray films of these patients were then freely mixed and an attempt was made to place each film in a group representing the closest definite X-ray evidence of pulmonary tuberculosis. The manner of classification was as follows: Those films showing nothing but increased density or enlargement of the root shadows were put in *group 1*, or the *root* group. *Group 2* comprised those showing a few or fairly numerous isolated tubercles. Films showing definite beading along the trunks were placed in *group 3*. In *group 4* were those showing definite pleuritic changes and in *group 5* were placed those films which showed indefinite but probable parenchymatous changes.

When thus classified, it was found that the number of films in each group were as follows: *group 1*, 32, *group 2*, 22, *group 3*, 57, *group 4*, 14 and *group 5*, 45.

The incidence of a history of hemoptysis or of pleurisy with effusion, or of tubercle bacilli in the sputum and râles, was next ascertained for each group. Table 1 shows the incidence of these in each group, as well as in an unselected group of 412 nonparenchymatous cases.

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[1] From the Trudeau Sanatorium, Trudeau, New York.

From the table it is seen that hemoptysis occurred most frequently in the *probable parenchymatous* and *isolated tubercles* groups. Pleurisy with effusion was naturally highest in the *pleurisy* group and next frequent in the *probable parenchymatous* and *isolated tubercles* groups. Tubercle bacilli were found at the sanatorium in all groups except the *isolated tubercles*, but most frequently in the *probable parenchymatous* group. Moderately coarse râles were found at an apex most frequently in the *pleurisy* group and at the base in the *probable parenchymatous* group. The striking feature, however, is the absence of a history of pleurisy with effusion or of hemoptysis and the absence of tubercle bacilli and râles in the *root*, *isolated tubercles* and *peritruncal* groups. In other words, the more nearly the X-ray findings approach the parenchymatous type, the more frequently one or more of the criteria of a positive diagnosis are found.

TABLE 1

	NUMBER	HEMOPTYSIS		PLEURISY WITH EFFUSION		BACILLI				RÂLES						NO PLEURISY, HEMOPTYSIS, BACILLI OR RÂLES		DEAD	
						Previous		Residence		Moderately Coarse				Fine					
										Apex		Base		Apex or Base					
		Number	*per cent*	*Number*	*per cent*	*Number*	*per cent*	*Number*	*per cent*	*Number*	*per cent*	*Number*	*per cent*	*Number*	*per cent*	*Number*	*per cent*	*Number*	*per cent*
Group 1: Root	32	4	13	2	6	5	16	1	3	1	3	2	6	5	16	14	43	2	6
Group 2: Isolated tubercles	22	5	22.5	3	13	2	9	0		1	5	2	9	8	37	7	32	0	
Group 3: Peritruncal tubercles	57	12	21	5	9	13	23	5	9	3	5	3	5	7	12	18	32	2	3.5
Group 4: Pleuritic	14	2	14	5	36	1	7	1	7	2	14	0		2	14	2	14	1	7
Group 5: Probable parenchymatous	45	13	28	7	16	7	16	6	14	4	9	10	22	6	14	8	17	5	11
Mixed group of nonparenchymatous cases	412		12		4		8		4		2		8		7		58		2

There were two deaths in the *root* group, one caused by diabetes mellitus and the other by general paralysis. The reports covered four years or more in all but four of the living patients. There have been no deaths in the *isolated tubercles* group. All of these but four had reports for four years or more. One death from embolus and one from septic peritonitis occurred in the *peritruncal* group. Four-years or more reports were received from 84 per cent of the living in this group.

In the *pleurisy* group one death occurred, after five years, from tuberculous peritonitis following removal of a "tumor." All but one patient sent in reports for four years or more. In the *probable parenchymatous* group five deaths occurred as follows: two from influenza, one from accident, one from pulmonary tuberculosis and one from sarcoma. The last also had an inactive pulmonary tuberculosis. All but two of the living gave four or more years' reports.

Therefore, it can be said that no deaths from pulmonary tuberculosis occurred in any of the groups with the exception of 2 per cent of the *probable parenchymatous*. One patient of the *pleurisy* group died of tuberculous peritonitis after five years. Nearly all of the patients in all groups rendered reports for four years or more.

In a nonselected group of 412 patients, in whom no definite parenchymatous tuberculous lesion could be found, 98 per cent were alive after four years and 2 per cent dead. Deducting from the 170 cases considered those having no suggestive or positive findings (49), we have 121 patients who had a pleurisy with effusion or an hemoptysis or râles or a history of positive sputum and in whose X-ray films no unquestioned parenchymatous changes, characteristic of pulmonary tuberculosis, could be seen. Of these only two have died within four years of tuberculosis (1.7 per cent): one of pulmonary and one of peritoneal tuberculosis.

CONCLUSIONS

1. The number of cases in each group considered is far too small to draw any definite conclusions. Nevertheless, it is noteworthy that no deaths occurred from pulmonary tuberculosis except in the probable parenchymatous group. The patient dying of tuberculous peritonitis, in all probability, had a pulmonary tuberculosis at the time of the pleurisy with effusion.

2. Although a patient may have had an hemoptysis or a pleuritic effusion or a history of positive sputum or râles and the X-ray not show a characteristic tuberculous parenchymatous lesion, the prognosis seems to be quite good, since only 1.7 per cent of 121 such cases have died of tuberculosis within four years.

Reprinted from The Journal of Immunology
Vol. IX, No. 4, August, 1924

IMMUNOLOGICAL STUDIES IN TUBERCULOSIS

II. FURTHER OBSERVATIONS ON SKIN HYPERSENSITIVENESS IN EXPERIMENTAL TUBERCULOSIS

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Received for publication June 3, 1924

Within the last few years the problem of skin hypersensitiveness has again assumed a prominent part in the field of experimental tuberculosis. There has been no great departure as far as the theory and the method employed in these investigations from that held and employed a decade or so ago; however, the whole tendency has been to follow the older methods of investigations, only attacking it from a little different angle.

A very careful search of literature reveals only a few papers which deal strictly with the production of skin hypersensitiveness with dead tubercle bacilli. The lack of interest in carrying on such investigations was probably due to the authoritative statements appearing from time to time that true tuberculin skin hypersensitiveness could not be set up in a normal animal with anything else but living tubercle bacilli. It is true that up to a few years ago, the true tuberculin skin hypersensitiveness was only produced successfully with living tubercle bacilli. On the other hand, in the early literature of tuberculosis, we can find many papers dealing with partial immunization with dead tubercle bacilli.

Theobald Smith (1) in his Mellon lecture states that all efforts to render normal guinea-pigs skin hypersensitive with dead tubercle bacilli were futile.

Krause (2) states that allergy produced with dead tubercle bacilli is inconstant, feeble and transitory, and that set up by living bacilli is marked, strong and durable. Interpreting this, it means that true and lasting skin hypersensitiveness cannot be produced in normal animals with the injections of dead tubercle bacilli.

Selter (3), more recently, has been more emphatic in his statement by saying that only living tubercle bacilli are able to bring about a skin-hypersensitive state in a normal animal.

In a recent publication (4) we pointed out that true tuberculin skin hypersensitiveness, contrary to the previous observation by the above mentioned investigators, can be set up in a normal animal after the injections of tubercle bacilli killed at various degrees of heat, and that such skin hypersensitiveness to tuberculin is indistinguishable in all its fundamental and essential respects from that observed in animals inoculated with living tubercle bacilli. The reaction appears at approximately the same time as that appearing in infected animals, and persisted for a long time. Animals sensitized with killed tubercle bacilli, in ten days to two weeks become skin-hypersensitive, not only to the 5 per cent old tuberculin, but also to the residue material first described by Zinsser (5).

The problem of skin hypersensitiveness with dead tubercle bacilli has been very carefully studied by Zinsser (6) and also by us, and we expect to publish from time to time the results obtained.

In proving to our satisfaction that skin hypersensitiveness can be produced with dead tubercle bacilli, it was interesting to ascertain how long such a skin hypersensitiveness could persist in an animal so sensitized. In the following two charts we have 7 guinea-pigs which have been under observation for a very long time. Two of these guinea-pigs were incorporated in our first paper, but, as they outlived the other member of their group, from time to time the skin test was done to see how long skin hypersensitiveness would persist in these animals.

Guinea-pig 115 received intraperitoneally three injections of 12.5 mgm. each, making a total of 37.5 mgm. of dead tubercle bacilli killed by heating for one hour at 100°C. They were injected intraperitoneally on June 26, July 2 and July 5, 1922. On July 10—fourteen days after the beginning of the experiment, and five days after the last injection—these 2 animals gave a positive skin test to 5 per cent old tuberculin and also the residue material. The reaction was typical, with induration and erythema, and was slightly more intense after twenty-four hours than at forty-eight. The animals ran fairly parallel as to the intensity of the reaction, with only a slight variation from the sixty-first day until two hundred and thirty-four days from the beginning of the experiment. After three hundred and fifty-eight days the reaction began to diminish in intensity, getting much weaker at the forty-eighth hour.

Animal 117 was given the skin test on the four hundred and fifty-third day after the beginning of the experiment, with the result of a fairly good reaction, though feeble, but, nevertheless, definite when compared with tuberculous controls. This animal died on November 10, 1923, and at the autopsy, no evidence of tuberculosis could be found. The superficial inguinal glands were normal, the spleen was slightly enlarged but not nodular, and no abnormality could be seen in the liver or the lungs.

On animal 115 the skin test was continued, and it gave a positive reaction on December 13, 1923—four hundred and ninety-seven days from the beginning of the experiment. This last reaction observed was feeble, completely disappearing at the forty-eighth hour. The animal died on December 20, 1923, and at the autopsy no evidence of tuberculosis could be found. The superficial inguinal glands were normal; there was only one tubercle in the peritoneum, which was probably due to the dead tubercle bacilli; the spleen was apparently normal, and no abnormality could be found in the liver or lungs. Suspected tubercle and the spleen were triturated and injected subcutaneously in a healthy guinea-pig. Forty-seven days after the injection, skin test was done on this sub-injected animal, which proved to be negative. This second animal was killed, and the autopsy revealed no tuberculosis.

In the second series of experiments, we had 5 guinea-pigs which received various amounts of killed tubercle bacilli.

Animals 122 and 124 were inoculated three times intraperitoneally with 1.25 mgm. each—a total of 3.75 mgm.

Animals 125 and 126 received a total of 7.5 mgm. by the same route, and guinea-pig 128 received, in all, 18.75 mgm., of tubercle bacilli H-37 killed at 100°C. for one hour. All but animal 124 gave positive skin tests eleven days from the beginning of the experiment, and the skin hypersensitiveness persisted for various periods of time.

Guinea-pig 126 died November 26, 1923. The suspected material from the peritoneum and the spleen were triturated and injected into a healthy guinea-pig. Forty days after the injection the animal gave negative skin reaction. Twenty-four hours later it was killed, and no evidence of tuberculosis could be found.

Guinea-pig 128 died February 19, 1924. The suspected material of this guinea-pig was triturated and injected into a healthy guinea-pig. Forty-three days later the skin test was done, which was negative. The animal was killed twenty-four hours later, and no evidence of tuberculosis could be found.

For details of these experiments, the reader is referred to table 2.

The interesting point to bring out from this second experiment is that even as small an amount as 3.75 mgm. of killed tubercle bacilli can set up a skin-hypersensitive state which persisted in animal 122 for three hundred and eighty-two days. There is no question as to the sterility of this material, because in no instance was there generalized tuberculosis in any of the animals, and no abnormality in these two experiments could be observed. Where the tubercles were present in the peritoneum, they were the result of dead organisms. It is very likely that skin hypersensitiveness persisted in these animals, for the reason that foreign particles of tubercles were present in the animal. This particular phase of the work is being studied at present in our laboratory and also in Professor Zinsser's Laboratory at Harvard University.

In summarizing, we wish to state that true tuberculin skin hypersensitiveness can be set up in a normal animal by the injections of tubercle bacilli killed at 100°C. for one hour. From unpublished work we have further proof that the substances

TABLE 1

GUINEA PIG NUMBER	SENSITIZATION				INTRACUTANEOUS TEST													
	June 26, 1922	July 1, 1922	July 5, 1922		July 10, 1922		July 18, 1922		July 26, 1922		August 25, 1922		September 12, 1922		October 17, 1922		February 14, 1923	
					24 hours	48 hours	24 hours	48 hours	24 hours	48 hours	24 hours	48 hours	24 hours	48 hours	24 hours	48 hours	24 hours	48 hours
	cc.	cc.	cc.															
115	1	1	1	5 per cent old tuberculin....	10×10	5×5	15×15	5×5	15×15	12×12	15×20	15×15	15×12	10×10	15×15	10×10	10×10	5×5
				Residue.......	15×15	10×10	15×15	10×10	15×15	10×10	15×15	10×10	10×10	5×8	18×18	10×10	10×10	5×5
117	1	1	1	5 per cent old tuberculin....	10×10	5×5	20×20	20×20	22×20	15×15	25×22	20×20	20×20	10×10	15×15	15×15	15×15	10×10
				Residue.......	15×15	10×10	25×25	20×20	20×20	20×20	25×20	20×20	10×10	5×5	15×15	15×15	15×15	10×10

GUINEA PIG NUMBER	SENSITIZATION				INTRACUTANEOUS TEST											
	June 26, 1922	July 1, 1922	July 5, 1922		June 8, 1923		July 7, 1923		September 18, 1923		October 30, 1923		November 29, 1923		December 13, 1923	
					24 hours	48 hours	24 hours	48 hours	24 hours	48 hours	24 hours	48 hours	24 hours	48 hours	24 hours	48 hours
115	1	1	1	5 per cent old tuberculin..........	10×10	10×10	12×12	10×10	10×10	5×5	10×10	5×5	5×5	0	5×5	0
				Residue..........................												
117	1	1	1	5 per cent old tuberculin..........	15×15	10×15	12×12	10×8	10×10	8×8	10×10	5×5				
				Residue..........................												

TABLE 2

GUINEA PIG NUMBER	SENSITIZATION			INTRACUTANEOUS TEST									
	October 20, 1922	October 22, 1922	October 28, 1922	October 31, 1922		November 14, 1922		December 18, 1922		February 14, 1923		March 6, 1923	
				24 hours	48 hours	24 hours	48 hours	24 hours	48 hours	24 hours	48 hours	24 hours	48 hours
	cc.	*cc.*	*cc.*										
122	0.1	0.1	0.1	8 × 8	0	12 × 12	5 × 5	15 × 15	12 × 12	15 × 15	15 × 15	15 ×15	15 × 15
124	0.1	0.1	0.1	0	0	12 × 12	0	15 × 15	12 × 12	10 × 10	10 × 10	10 × 10	10 × 8
125	0.2	0.2	0.2	12 × 12	5 × 5	10 × 10	5 × 5	15 × 15	12 × 12	15 × 15	15 × 15	10 × 10	10 × 10
126	0.2	0.2	0.2	8 × 8	0	10 × 10	5 × 5	15 × 15	12 × 12	12 × 12	12 × 12	?	0
128	0.5	0.5	0.5	12 × 12	5 × 5	10 × 10	5 × 5	15 × 15	15 × 15	8 × 8	8 × 8	15 × 15	0*

GUINEA PIG NUMBER	SENSITIZATION			INTRACUTANEOUS TEST									
	October 20, 1922	October 22, 1922	October 28, 1922	June 8, 1923		September 18, 1923		October 30, 1923		November 29, 1923		January 21, 1924	
				24 hours	48 hours	24 hours	48 hours	24 hours	48 hours	24 hours	48 hours	24 hours	48 hours
122	0.1	0.1	0.1	22 × 22	20 × 20	15 × 15	10 × 10	18 × 18	12 × 12	15 × 15	10 × 10		
124	0.1	0.1	0.1	15 × 15	15 × 15	15 × 15	10 × 10	18 × 18	12 × 12				
125	0.2	0.2	0.2	18 × 18	18 × 18	15 × 15	12 × 12	12 × 12	10 × 10	10 × 10	8 × 5		
126	0.2	0.2	0.2	10 × 10	10 × 10	12 × 12	10 × 10	10 × 10	5 × 5				
128	0.5	0.5	0.5	20 × 20	20 × 20	18 × 15	15 × 15	15 × 15	15 × 15	12 × 12	12 × 12	10 × 10	5 × 5

Tubercle bacilli killed at 100°C. for one hour. One cubic centimeter contained 12.5 mgm. of tubercle.
Intensity of the reaction is in millimeters. For the intracutaneous test 5 per cent Old Tuberculine was used.
* Diffuse.

responsible for setting up true hypersensitiveness are not even destroyed by heating for one-half hour at steam pressure at one atmosphere (121°C.).

The success of this sensitization depends on the following few points: The tubercle bacilli must be triturated well, made up in good suspension, and the reaction adjusted to pH 6.9 or 7.0 before sterilization. Above all, one of the most important points is that animals suitable for such sensitization must weigh 400 grams or over. They must be well fed and kept in good condition. The injection should be made every three or four days. It seems, so far, that the intraperitoneal route is the most suitable one.

After each injection of killed tubercle bacilli, there is a distinct drop in the weight of the animal. In a day or so, the animal again picks up his weight, but the drop follows after subsequent injections, and as soon as the three injections have been made, the animal gradually recovers the loss and begins to gain very rapidly.

It is an interesting observation that if the animal suddenly begins to lose weight, the skin hypersensitiveness also diminishes somewhat.

Autopsy

Guinea-pig 115. Died December 20, 1923, weight 822 grams; well nourished; slight paralysis on left side; superficial inguinal glands normal; adhesion in peritoneum; also one tubercle; spleen slightly enlarged; otherwise, normal; lungs, liver, bronchial and cervical glands normal.

Guinea-pig 117. Died November 10, 1923; weight 632 grams; superficial inguinal glands normal; deep and iliac glands normal; few tubercles in the peritoneum, same as found in all animals treated with dead tubercles; spleen slightly enlarged, but no tubercles; liver, lungs, cervical and bronchial glands normal.

Guinea-pig 122. Died January 10, 1924. Autopsy finding same as guinea-pig 126.

Guinea-pig 124. Died November 10, 1923. The animal was apparently normal. No evidence of tuberculosis. Only a few masses of tubercles in the peritoneum, which were due to injection of dead tubercle bacilli.

Guinea-pig 125. Died January 16, 1924. Autopsy finding the same as guinea-pig 126.

Guinea-pig 126. Died November 26, 1923. Superficial inguinal glands normal. In the peritoneum, a few tubercles; spleen slightly enlarged but not nodular; liver, lungs, bronchial and cervical glands apparently normal. No tuberculosis.

Guinea-pig 128. Died February 19, 1924. Autopsy findings were same as in preceding animals. A few tubercles were present in the peritoneum; liver, lungs and bronchial glands normal; spleen slightly enlarged but not nodular. No tuberculosis.

Weight in grams

DATE	GUINEA-PIG 115	GUINEA-PIG 117
June 26, 1922	520	412
July 1, 1922	510	412
July 5, 1922	554	422
July 10, 1922	580	430
July 18, 1922	610	460
July 26, 1922	595	472
August 25, 1922	620	460
September 12, 1922	626	491
October 17, 1922	610	510
February 14, 1923	720	590
July 7, 1923	830	632
October 30, 1923	863	665
November 29, 1923	895	
December 13, 1923	890	

Weight in grams

DATE	GUINEA-PIG 122	GUINEA-PIG 124	GUINEA-PIG 125	GUINEA-PIG 126	GUINEA-PIG 128
October 20, 1922	404	393	418	415	460
October 24, 1922	353	352	355	363	402
October 28, 1922	378	400	395	425	452
November 1, 1922	365	407	387	418	468
November 15, 1922	428	441	427	442	528
December 18, 1922	483	577	506	517	680
February 15, 1923	542	633	780	636	847
March 16, 1923	700	780	662	605	844
June 8, 1923	713	632	700	632	907
September 18, 1923	785	686	810	812	986
October 30, 1923	810	705	855	833	1005
November 29, 1923	892		902		1063

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Reprinted from The American Review of Tuberculosis
Vol. X, No. 2, October, 1924

STUDIES WITH ULTRAVIOLET LIGHT[1]

I. THE EFFECT OF QUARTZ-MERCURY-VAPOR IRRADIATIONS (ALPINE QUARTZ-LIGHT) ON EXPERIMENTAL TUBERCULOSIS OF THE CORNEA IN RABBITS

EDGAR MAYER and MORRIS DWORSKI

Corneal tuberculosis, experimentally produced in rabbits' eyes, is a favorable superficial form of the disease on which to study the local action of ultraviolet radiation. Lupus in patients has been shown to heal under radiations from the carbon-arc lights, after contact pressure-exposures and over prolonged periods; the effective rays were the ultraviolets and violets, inasmuch as most of the others were filtered out. The exact mechanism of the healing process is unknown, but it is probably the result of a combination of successive changes, namely, hyperemia, chemical disturbances, destruction of some bacteria, and local action on the products of the exciting bacteria. Focal reaction seems the most prominent factor, and in its healing effect we are reminded of similar results produced by tuberculin.

In 1885 Baumgarten (1) described the evolution of the corneal tubercle. This tuberculous lesion can be constantly observed and the changes easily noted under different experimental conditions. Lewis and Montgomery (2) have employed experimental corneal tubercle to determine the value of certain therapeutic agents, such as Lugol's solution, calcium lactate, benzol and tuberculin. Passow (3) claims to have shown that artificial light and sunlight, applied directly, can heal tuberculous conjunctivitis and corneal ulcers in patients. Krusius (4) found that a few exposures of altitude and lowland sunlight did not, to any extent, affect the eye lesions of rabbits. The X-ray and thorium also proved unsatisfactory. However, the absence of changes under a few irradiations carries little weight when we realize that with lupus it requires six months of regularly repeated exposures to stimulate healing. Solar radiation does produce increased albumin in the aqueous humor, indicating some organic effect upon the deeper vessels. By raying with sunlight immediately after inoculation, Krusius was able to hinder the development of the lesion; but further exposure of the eye did not affect the progress of the disease. The preliminary delay in the disease might have been due to the action of the longer and more deeply penetrating solar rays on the inoculated bacilli.

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[1] Conducted under fellowships of the Trudeau Foundation, Saranac Laboratory, Saranac Lake, New York.

TECHNIQUE OF INTRACORNEAL INOCULATION

In the authors' experiments a bovine strain of tubercle bacilli of moderate virulence (B1 of the Saranac Laboratory) was the infecting agent. The culture was grown on 5 per cent glycerine broth. The bacilli were emulsified, and the suspension was centrifugalized at high speed to remove clumps. A loopful of the cloudy supernatant fluid contained between 40 and 50 bacilli to the field, singly and in small clumps. The rabbits' eyes before inoculation were thoroughly anesthetized with cocaine. Then, with a sharply pointed eye-scalpel, the corneal margin was split parallel to its surface by lateral incision, producing an opening 2 to 3 mm. long, and care was observed not to puncture the anterior chamber. Into this pocket two loopfuls of the culture were inserted. (The loop was about 2 mm. in diameter.) With this method it was possible to produce a satisfactory corneal lesion.

A mercury-quartz alpine lamp with a burner, 300 hours old, 110 volts, A. C., was the source of the radiation. The spectrum of this radiation shows mostly actinic rays; namely, violet, blue, and ultraviolet. The ultraviolets are of much shorter wave-length than those of the solar spectrum and are the most easily absorbed and very irritating; therefore, pronounced focal reactions were quickly produced. The lamp was run on an alternating current, 110 volts; it was burned to its high point of luminosity (about 10 minutes) before the animals were exposed. Irradiations were first given beginning with 2 to 5-minute exposures at a distance of 10 inches from the burner. The subsequent dosage was determined by the reaction of the eye. The intervals between exposures depended, in most cases, on the subsidence of the eye reaction. The treated eye was held open by the operator and the uninfected eye covered during the irradiation.

PLAN OF EXPERIMENTS

Thirty-two rabbits were used and divided into groups as follows:

Group A: 7 controls, not irradiated.
Group B: 6 irradiated, beginning 24 hours after infection.

Group C: 9 irradiated, beginning 10 days after infection.
Group D: 6 irradiated, beginning 10 days after infection and, in addition, the eye flooded with 1 per cent aqueous solution of eosin during exposure.
Group E: 4 irradiated, beginning 10 days after infection; eye flooded with a saturated aqueous solution of quinine muriate during exposure.

Group A: Development of the corneal lesion in the controls: Observations were made on the eyes without the use of a lens, and under daylight. A somewhat lengthy description will be given of the evolution of the disease in the controls, inasmuch as they will form the basis for describing changes in the treated groups. The period of time quoted for the appearance of the various phases of the disease is an average for the animals observed. The progress of the disease was fairly uniform in the controls. For 24 to 48 hours after inoculation a slight cloudiness persisted in the area of inoculation. The sclera and bulbar conjunctiva appeared normal. The opacity at the point of inoculation in most animals disappeared at the end of 24 hours, and only on careful examination could the incision in the cornea be discerned. There was no change until the eighth day, when the opacity at the point of inoculation reappeared with a beginning area of vascular injection of the conjunctiva adjacent to the portion of the infected cornea. On the 13th day marked opacity, about 2 to 4 mm., indicated the formation of tubercle. The lids and the portion of the conjunctiva adjacent to the area of inoculation were then markedly congested and there was a slight swelling of the cornea. On the 15th day several small whitish points appeared around the larger area of opacity, indicative of metastasis. On the 21st day corneal and circumcorneal vascularization or pannus first appeared, with several small capillaries located at the outermost edge of the cornea. On the 23rd day the centre of the tubercle became caseous and the cloudy area now extended to the pupil. The pannus was enlarged and there was a marked distortion of the cornea. On the 27th day the corneal epithelium over the caseous area broke through, and formed an ulcer with a purulent discharge, as a staphyloma appeared. The progress of the disease continued, so that on the 49th day the entire area of the cornea and pupil was involved. The discharging ulcer was surrounded by a vascular band. There was no tendency to heal spontaneously. On the 126th day the eye presented a mass of ulcerated tissue. This description was rather typical of the progression of disease in all the control animals.

Group B: Irradiation 24 hours after infection: Irradiation was begun 24 hours after infection in an endeavor to abort the development of the tubercle. This group included two series, group B1 consisting of four rabbits, and group B2 consisting of only two rabbits. Two others died on the eighth day of experiment. The periods and time of exposures are shown in table 1.

TABLE 1

GROUP B1			GROUP B2		
Day of radiation after infection	Time	Distance	Day of radiation after infection	Time	Distance
	minutes	*inches*		*minutes*	*inches*
1	5	10	1	2	10
3	5	10	4	2	10
7	8	10	7	4	10
9	10	10	9	6	10
11	10	10	11	6	10
15	15	10	17	6	10
19	15	10	25	7	10
23	15	10	29	7	10
25	15	10	39	8	10
29	20	10	46	9	10
34	20	10	53	10	10
43	20	10	60	11	10
49	20	10	67	12	10
56	20	10	76	13	10
60	20	10	88	15	10
76	20	10			
Total 213 minutes			Total 118 minutes		

In group B1 the first exposure was five minutes at a distance of 10 inches from the lamp. On the following day the conjunctivae were congested and swollen. When this began to subside (3rd day) the eyes were again exposed. The reaction was then very severe, the vessels in the conjunctivae were very prominent, the lids were inflamed, and an exudate partly closed the eyes. On the 7th day this marked reaction began to subside. Tubercles became evident in this group between the 7th and 9th days, the light producing no inhibitory effects. From then on the disease was progressive, despite radiation, and in two of the animals it was even more marked than in the controls. Although the irradiations were continued, the eyes were similar in appearance to that of the controls at the end of 60 days. It was evident that the dosage of light employed produced harmful reactions and, instead of a favorable effect in combating the infection, the opposite occurred.

In group B2 a smaller dosage of radiation was administered, and better results were obtained. Though the tubercle developed, its course was much slower. In the rabbit which died on the 74th day, due to an intercurrent infection, a small area of opacity was the only remaining indication of the disease. In the surviving rabbit caseation appeared on the 27th day and remained localized until the 67th day. No ulceration occurred and this animal died on the 95th day.

TABLE 2

GROUP C1			GROUP C2		
Day of radiation after infection	Time	Distance	Day of radiation after infection	Time	Distance
	minutes	*inches*		*minutes*	*inches*
10	3	10	11	2	10
12	6	10	15	4	10
14	10	10	18	4	10
19	15	15	25	5	10
33	20	1	29	5	10
45	20	2	39	6	10
67	10	10	46	7	10
73	15	10	53	8	10
80	15	10	60	9	10
			63	10	10
			76	11	10
			89	12	10
Total 114 minutes			Total 83 minutes		

Group C: Irradiation begun 10 days after infection: This group was divided into group C1 of 5 rabbits and group C2 of 4 rabbits. The periods and time of exposures are shown in table 2.

In series C1 the increase of dosage was made rather too rapidly and produced marked eye reactions. The disease during the first exposures seemed to be aggravated but, with the subsidence of the signs of focal reaction, the tuberculous lesion gradually lost its inflammatory appearance. The favorable influence of the light was evident in both of these groups. The pannus appeared in all treated animals from the 21st to the 30th day, being delayed when compared with the 21st day which was the average period of the controls. The light appeared to localize the disease, and there was a definite retardation of the development of secondary tubercles around the caseating focus. In the controls these small whitish areas of secondary tubercles appeared between the 15th and 21st days, while in the treated eyes there was a marked delay and wide variation; for instance, they first appeared on the 21st, 34th, 37th, 39th, 53rd and 74th days. The first signs of healing in most cases came after the 50th day. At this time all of the controls showed gross disease, but the treated eyes began to develop fibrous tissue over the ulcerated surface. Granulation tissue formed, and the focus of caseation was slowly absorbed. The blood vessels, also pannus which had grown over the cornea from the conjunctiva, gradually disappeared. Observations made on the 110th day disclosed that in all treated animals the pannus was no longer present. In 7 animals the caseation had been absorbed, leaving an opaque area on the cornea. The conjunctiva above the area of the infected cornea was corrugated in appearance, due to fibrous tissue. The other three rabbits still showed caseation.

Group D: Irradiation started 10 days after infection: Eye instilled with a 1 per cent aqueous solution of eosin: This group first consisted of 6 rabbits, in which the treated eye was kept flooded with 1 per cent eosin (Gruebler's aqueous solution), during irradiation. Unfortunately 4 animals died of intercurrent diseases early in the course of the tuberculous infection, so that we had only two rabbits for observation. The rationale for the use of eosin in this group and the quinine in *group E* was to sensitize the tissue to light irradiation by a fluorescent substance. Eosin and quinine possess this property. (For tissue sensitization to light, see E. Mayer, AMERICAN REVIEW OF TUBERCULOSIS, 1921, v, 2.) The dose of light was the same as in *group C2*. The disease in the two rabbits was slow in evolution, and healing took place. The lesions did not ulcerate. In the 4 rabbits that died from intercurrent diseases the eye results appeared promising.

Group E: Irradiation started 10 days after infection: Eye instilled with saturated aqueous solution of quinine: Four rabbits were used. The dose of light was the same as for *group C2*. The quinine was applied like the eosin. In two rabbits we had to conclude that the quinine had no effect on the progress of the disease as the course was similar to that in *group C*. However, in the other two rabbits quinine seemed to have a harmful effect, and the disease progressed with no sign of healing, so

TABLE 3

Average time of the appearance of various stages in the evolution and healing of corneal tubercle in all groups

GROUPS	FIRST APPEARANCE OF TUBERCLE AS DENSE CLOUDINESS AT POINT OF INOCULATION	APPEARANCE OF BLOOD VESSELS IN CORNEA (PANNUS)	FIRST APPEARANCE OF CASEATION	APPEARANCE OF SECONDARY OR METASTATIC TUBERCLES	STAPHYLOMA AND ULCERATION	BEGINNING OF ABSORPTION OF CASEATION	HEALING TUBERCLE, GRANULATION AND DISAPPEARANCE OF PANNUS	NONHEALING TUBERCLE
	day	*day*	*day*	*day*	*day*	*day*	*day*	*day*
Irradiation commenced 24 hours after infection	9	23	27	74 (one rabbit)	Absent	60	95	
Irradiation commenced 11 days after infection	9	22	31	43	67	58	110	
Irradiation (plus quinine) commenced 11 days after infection	10	22	21	36	41	In one rabbit no absorption; in the other 82nd day	110 (one rabbit)	110 (one rabbit)
Irradiation (plus eosin) commenced 11 days after infection	10	30	34	49	Absent	58	98	
Controls	9	21	17	18	27	Absent	Absent	110

that on the 110th day the eye was a mass of disease possibly worse than that of the controls.

In a previous experiment, the authors had instilled some tuberculous eyes of rabbits with eosin and quinine almost daily without other treatment, and no effect was produced on the development of the disease. Consequently this control was not repeated in the present series.

EFFECT OF ULTRAVIOLET RADIATION ON THE NORMAL EYES OF RABBITS

It appeared to be important to decide before radiating patient's eyes whether any harm could result to the eye.

Direct ultraviolet radiation from a new quartz-burner to the normal open eyes of rabbits for one hour at a distance of three feet caused no ulceration. Radiation for half an hour at a distance of ten inches caused clouding of the cornea that cleared in three weeks. Three hours after the half-hour exposures, a marked irritation of the conjunctiva and cornea appeared, which gradually increased and after two days the cornea appeared abraded. The inflammation soon receded, but a corneal cloudiness appeared, which persisted until about the 20th day. No further changes were evident after that time.

DISCUSSION AND CONCLUSION

It is evident that in the application of light to a superficial focus of experimental tuberculosis, such as in the cornea, errors may occur which must be avoided to obtain the best results. One factor of importance is the use of the proper number of bacilli for inoculation. Too large an infecting dose sets up a rapidly progressive disease against which radiation is ineffective. If the dose is too small spontaneous healing of the tubercle may follow. Finally, as we have noted, overexposures to untraviolet radiation may irritate instead of heal.

Jansen first mentioned the histological changes in the tubercle of a rabbit's cornea, after exposures to actinic radiation; namely, vascular dilatation, partial thrombosis, destruction of giant and epithelioid cells, followed by a serous and serofibrinous exudate, collections of leucocytes, and, finally, vacuolization and necrosis. In lupus Finsen found, under compression treatment, fewer blood-vessel changes because of less vascularity. Jansen found these effects no deeper than 0.5 mm. The direct destruction of the bacilli themselves in these lesions seems to play only a minor part, if any, in these exposures. The tissue reaction performs the major rôle in the destruction. Finsen could destroy the bacilli with carbon-arc radiation, through the depth of a rabbit's ear, but only under extreme pressure which caused a dehematization of the tissues. Hemoglobin itself strongly absorbs the actinic rays. Klingmüller and Halberstadt were still able to infect guinea pigs by inoculating them with healing lupus tissue, after it had been treated with carbon-arc radiations. A destruction of some of the bacilli, or an attenuation of them, may have occurred however.

Conjunctival tubercle or phlyctenule possibly responds to radiation much more rapidly, because of the ease of producing focal reaction in that tissue. The cornea itself is avascular, so that the hyperemia induced in it during a focal reaction with light radiation is from the proliferating conjunctival vessels.

It is evident that the question of dosage of light is one that must be worked out experimentally for each tissue. There are too many varying factors to allow us to formulate rules for treatment of an eye tuberculosis with ultraviolet radiation.

In human corneal tuberculosis, Passow reported healing by direct exposures of the open eye. We have had experience with two such cases and the results were favorable. We included partial exposure of the conjunctiva in order to induce a more marked focal reaction. These reactions were very painful, and had to be relieved by cocaine. Similar focal reactions, followed by healing, have of course been induced by tuberculin.

Quinine as a sensitizing substance has strong absorptive power for ultraviolet radiations, and it fluoresces easily. However, it seemed to irritate too much in our few experiments. Macht recently found that exposures of white rats to ultraviolet radiations, following injections of quinine, caused a slightly greater activation of the drug than without such exposures. Eosin seemed to definitely help in our experiments. Gassul and Levy have shown how eosin can sensitize the organs of white mice to ultraviolet radiation. Gyorgy and Gottlieb have also shown it to sensitize the tissues in rickets of children so that it shortened the period of treatment with ultraviolet radiation markedly. We feel, however, that with any local tuberculosis, treated with radiation, the need of always combining local with general body exposures should be emphasized.

CONCLUSIONS

We believe that our experiments show that the ultraviolet light has definitely influenced the healing of the corneal tubercle of rabbits' eyes.

Figures 1 to 4 will show the difference between the controls and the radiated animals.

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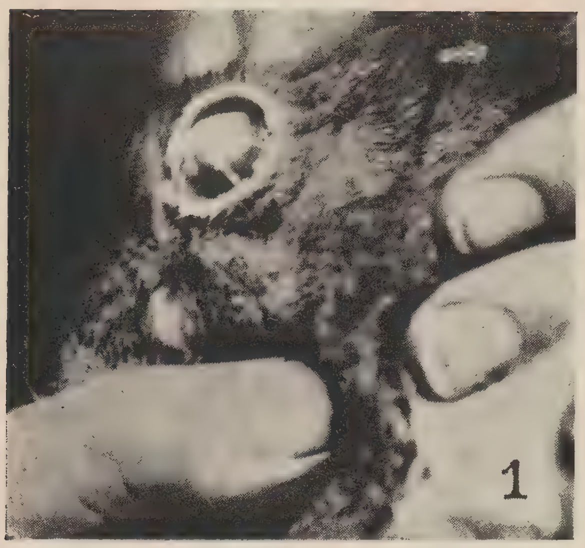

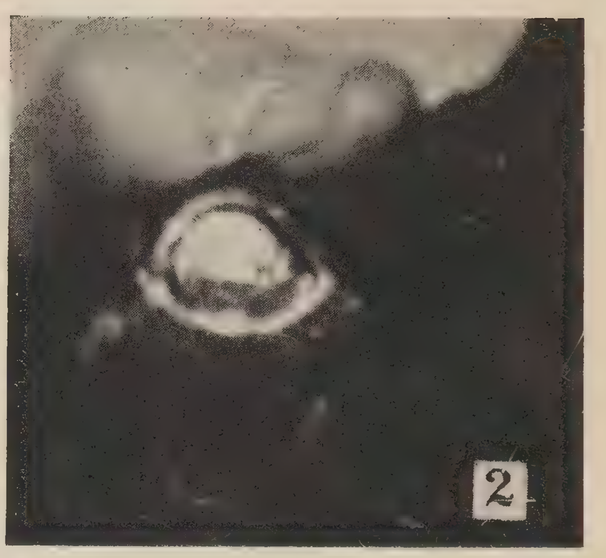

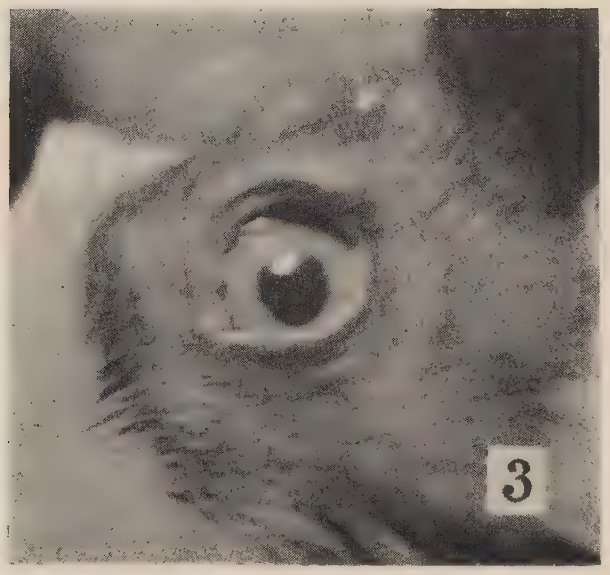

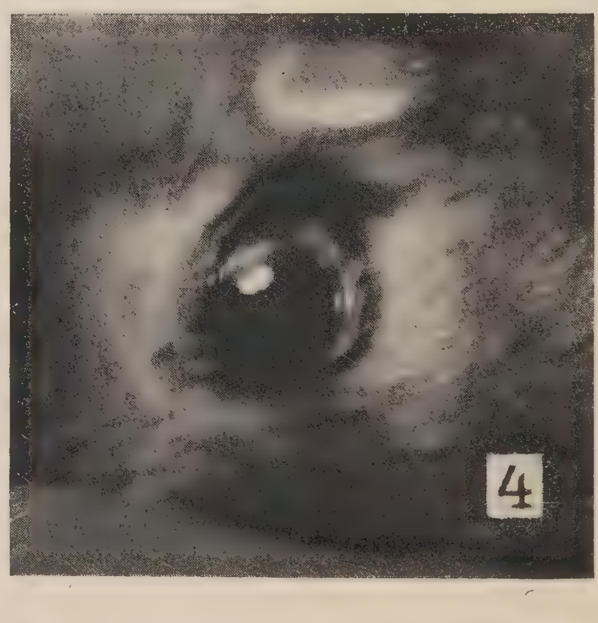

Figs. 1 and 2. Caseous Bovine Tuberculosis of Rabbits' Eyes; Progressive Lesions in Untreated Tuberculosis

Fig. 3. Bovine Tuberculosis of Rabbit's Cornea Healed by Ultraviolet Irradiations Combined with Eosin Instillations

Fig. 4. Bovine Tuberculosis of Rabbit's Cornea Healed, with Opacity, by Ultraviolet Irradiations Alone

Reprinted from The American Review of Tuberculosis
Vol. X, No. 2, October, 1924

STUDIES WITH ULTRAVIOLET LIGHT[1]

II. THE ACTION OF QUARTZ-MERCURY-VAPOR IRRADIATION ON INHALATION TUBERCULOSIS IN PRIMARILY INFECTED AND SENSITIZED GUINEA PIGS

EDGAR MAYER AND MORRIS DWORSKI

Ultraviolet irradiation has been variously viewed by clinicians in its effect on pulmonary tuberculosis. Some enthusiasts, such as Augsten, König, Aschenheim and Weill, have strongly advocated it. For the most part, however, it has been considered only as an adjuvant, of little value except for nonpulmonary tuberculosis, in which it has proved its greatest usefulness. Efforts to investigate the problem have thus far been disappointing in results.

Only a few experiments have been carried out with animals. Rohde reported a series that had most unconvincing results. He inoculated twelve 300 gm. guinea pigs with 1 cc. of a saline emulsion of tuberculous sputum and then radiated the shaved animals with the Alpine lamp. The radiated guinea pigs showed no gross tuberculosis, and microscopically only an occasional tubercle one month after infection, whereas the controls had marked cachexia and widespread tuberculosis of the liver and spleen with caseation of the lungs, peritoneum, inguinal lymph nodes and pelvis. Rohde concluded that the radiation had a very marked influence in hindering the development of the infection. On the other hand, Hase conducted similar experiments, with negative results. Recently, Gassul, in presenting this work, tries to explain the contradiction in results by claiming that Hase employed too large a dose of highly virulent tubercle bacilli for his animals and therefore could not expect favorable results.

In view of the conflicting statements our experiments were planned with the hope of something more definite being determined. It was planned to radiate shaved and unshaved animals. With rickets in rats it has been found unnecessary to shave animals when treating them with ultraviolet radiation, in order to bring about clinical healing and an increase in inorganic phosphorus. However, in malaria of birds, Whitmore induced relapses by light exposure much more easily when only a small area of skin was shaved than when all feathers were intact. Lutz showed that, histologically, the same changes occurred under ultraviolet radiation in the skin of guinea pigs as in human skin. Kestner, however, with dogs, was unable to produce an erythema with one-hour exposures at twenty inches. With our guinea pigs and rabbits we were well able to obtain both erythema and desquamation on shaved areas. The darker skin of rabbits eventually formed good pigmentation. It was decided with our guinea pigs to employ intracutaneous tuberculin injections as guides to allergy tests, which are considered as closely correlated with the extent of disease in guinea pigs. The dosage of radiation had to be given empirically, there being no particular guide, but it was aimed to maintain a mild erythema. During exposures the eyelids protected the conjunctiva satisfactorily. Other experiments, now being carried out, will aim to solve the question of production of focal reactions in pulmonary tuberculosis when an overdose of radiation is given.

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[1] From the Saranac Laboratory, Saranac Lake, New York.

PRIMARY GROUP I

Eighteen guinea pigs were first used. An inhalation infection was made as described by Baldwin and Gardner in the American Review of Tuberculosis, August, 1921, p. 446. A strain of moderate virulence (H37 of Saranac Laboratory) was the infecting microörganism, and the suspension contained 6 to 10 bacilli to a field when a loopful was spread over an area 20 mm. in diameter. The animals were divided into three subgroups of 6 each: *I-1*, to be irradiated daily, immediately after infection; *I-2*, seventeen days after infection; and *I-3*, the controls. Nine were shaved every few days over the greater part of the back; nine others were unshaved. The first exposure was for 10 minutes at a distance of 1½ feet from the lamp. It was repeated daily but increased five minutes until two hours' radiation, the maximum exposure, was given. Each subgroup received 31 consecutive daily exposures. Intracutaneous skin tests were made at intervals, 17 days after infection, and later, using 0.1 cc. of 5 per cent O. T. The animals were killed and autopsied 58 days after infection. The source of radiation was an Alpine Lamp, 110 volts, A.C., with a burner of 400 hours usage.

TABLE 1

Skin reactions of subgroup I-1 (single infection, inhaled)

GUINEA PIG	17 DAYS AFTER INFECTION	24 DAYS AFTER INFECTION	29 DAYS AFTER INFECTION	34 DAYS AFTER INFECTION	52 DAYS AFTER INFECTION	58 DAYS AFTER INFECTION
1	−	+	+	+++	++	++
2	+	−+	+++	++++	+++	+++
3	+	+	++	+++	++	+++
4	−	−+	+	+++	++	++
5	+	+	++	++++	++	+++
6	+	+	++	+++	+++	+++

TABLE 2

Skin reactions of subgroup I-2 (single infection, inhaled)

GUINEA PIG	17 DAYS AFTER INFECTION	24 DAYS AFTER INFECTION	29 DAYS AFTER INFECTION	34 DAYS AFTER INFECTION	52 DAYS AFTER INFECTION	58 DAYS AFTER INFECTION
1	+	+	+++	+++	+++	++++
2	−	−	−	++	++	+++
3	+	+	+	+++	+	++
4	−	−	+	++	++	+++−
5	+	+	+	++	++	+++
6	+	−	+	+++	+++	+++

TABLE 3

Skin reactions of subgroup I-3 (controls—single infection, inhaled)

GUINEA PIG	17 DAYS AFTER INFECTION	24 DAYS AFTER INFECTION	29 DAYS AFTER INFECTION	34 DAYS AFTER INFECTION	52 DAYS AFTER INFECTION	58 DAYS AFTER INFECTION
1	−	−	+	++	++	++
2	−	−	Died			
3	+	+	++	+++	++	+++
4	+	+	+	+++	+	+++
5	+	+	++	++	++	++
6	−	−	+	+++	+++	+++

Classification of Intracutaneous Tests

∓: Doubtful

+: Erythema or induration, 10 mm. × 10 mm., occurring 24 to 48 hrs. after injection, persisting and gradually fading

++: Erythema and induration

+++: Erythema or induration with central ulceration

++++: Erythema or induration with marked ulceration

TABLE 4

Autopsies of animals infected once by inhalation

GROUP	GUINEA PIG NUMBER	LYMPH NODES							SPLEEN	LIVER	LUNGS	DAYS AETER INFECTION
		Superficial inguinal	Deep inguinal	Retro-peritoneal	Tracheo-bronchial	Bronchial	Cervical	Iliacs				
I-1	1	0	0	+	+	0	0	0	++	0	++	59
	2	+	+	+	+	+	+	+	+++	++	++	59
	3	++++	++++	+++	++++	+++	+++	++++	++++	++++	++++	59
	4	+++	+++	++	++++	++	++	+++	++++	+++	++++	59
	5	++	+++	+++	+++	++	+++	+++	++++	++++	++++	59
	6	+++	+++	+++	+++	++	++	+++	++++	++++	++++	59
I-2	1	++	+	+	++	+	0	+	+	+	++	59
	2	++	+	+	++	0	—	+	++	0?	+++	59
	3	+++	+++	++	++	+	+	++	++	+	+++	59
	4	++	++	+	+++	+	+	++	+++	+++	++++	59
	7	++	++	++	++	+	+	+++	+++	+++	++++	59
	6	+++	++	++	++	+	+	++	++	++	+++	59
I-3	1	+	+	+	++	0	0	+	++	+	+++	59
	2	+	+	+	++	0	0	+	++	+	++	59
	3	++	++	+	++	+	0	++	+++	++	++++	59
	4	++	++	+	++	0	0	+	++	+	+++	28
	5	++	++	+	++	+	+	+	++	++	+++	59
	6	++	++	+	++	0	+	+	+++	++	+++	59

Classification

Lymph Nodes:

+ = sl. enlarged and hard
++ = enlarged and caseous
+++ = enlarged; firmer and fibrocaseous
++++ = enlarged and caseous almost throughout

Organs (lungs, liver and spleen):

+ = isolated tubercle
++ = enlarged organ with scattered tubercles
+++ = enlarged with conglomerate tubercles
++++ = enlarged and studded with tubercles in stage of caseation.

RESULTS

The findings from the intracutaneous reactions are given in tables 1, 2 and 3, and the autopsy changes in table 4. The course of the disease was apparently not modified by the radiation and the skin tests were uniformly positive in both control and treated animals.

SENSITIZED GROUP II

Eighteen guinea pigs were used and divided into three subgroups similar to those of the foregoing experiment. All were sensitized by receiving 0.5 cc. of a suspension of R1 culture (2 to 6 bacilli to the field). R1 is a human tubercle bacillus of very low virulence for guinea pigs when inoculated subcutaneously. In subgroup II-1 irradiation was begun immediately after infection. Exposures were made first for 10 minutes at 1½ ft. from the lamp and were increased 5 minutes daily until an exposure of one hour was reached, and thereafter irradiations were given daily for an hour for 32 days. In subgroup II-2 irradiation was begun 17 days after infection, and then succeeding exposures were made similar to those of subgroup II-1. Subgroup II-3 made up the controls. Thirty-two days after primary infection, all animals were reinfected by inhalation, with H37 according to our procedure with the primary-infection group. Irradiation was then increased daily 5 minutes in subgroups II-1 and II-2 until two hours' exposure was reached, and so continued until 31 days after the inhalation infection.

Intracutaneous tests were made, at intervals, 17 days after infection and later. The animals were killed and autopsied 72 days after the primary infection. The records of the intracutaneous tests are given in tables 5, 6 and 7 and the autopsy findings in table 8.

RESULTS

The intracutaneous reactions at 52 and 58 days were less marked in all treated animals but one, and the extent of tuberculous involvement as shown in table 8 was similarly less than in the primary-infection group.

From this series of experiments it is inferred that ultraviolet irradiation did modify the course of tuberculous infection in guinea pigs, and perceptibly the allergic reaction, as manifested by the intracutaneous tests.

TABLE 5

Intracutaneous reactions of subgroup II-1 (double infection, inhaled)

GUINEA PIG	17 DAYS AFTER INFECTION	24 DAYS AFTER INFECTION	29 DAYS AFTER INFECTION	34 DAYS AFTER INFECTION	52 DAYS AFTER INFECTION	58 DAYS AFTER INFECTION
1	–	+	++	++	+	+
2	–	++	++	++	+	+
3	–	++	++	++	+	+
4	+	++	++	++	+	+
5	–	+	+	++	+	+
6	+	+	++	++	+	+

Reaction positive at 24 days.
Reaction at 52 and 58 days lessened.

TABLE 6

Intracutaneous reactions of subgroup II-2 (double infection, inhaled)

GUINEA PIG	17 DAYS AFTER INFECTION	24 DAYS AFTER INFECTION	29 DAYS AFTER INFECTION	34 DAYS AFTER INFECTION	52 DAYS AFTER INFECTION	58 DAYS AFTER INFECTION
1	+	+	++	++	+	+
2	–	++	+	++	+	+
3	–	++	++	++	++	+
4	+	++	++	+++	+++	+++
5	–	+	++	++	+	+
6	–	+	++	++	+	+

Cutaneous reaction lessened at 52 and 58 days except in guinea pig 4.

TABLE 7

Intracutaneous reactions of subgroup II-3 (controls—double infection, inhaled)

GUINEA PIG	17 DAYS AFTER INFECTION	24 DAYS AFTER INFECTION	29 DAYS AFTER INFECTION	34 DAYS AFTER INFECTION	52 DAYS AFTER INFECTION	58 DAYS AFTER INFECTION
1	–	–	+++	+++	+++	+++
2	+	++	++	++++	+++	+++
3	–	++	++	++	+	+
4	–	++	++	++	+++	+++
5	–	+	++	+++	+++	+++
6	+	+	++	++	+++	++

Controls show no diminished reaction except in guinea pig 3.

ACTION OF ULTRAVIOLET IRRADIATION ON TUBERCULOUS GUINEA PIGS INFECTED SUBCUTANEOUSLY

Sixteen guinea pigs were infected subcutaneously in the right groin with 1 cc. of an emulsion containing 2 to 6 bacilli to the field (H37). The animals were divided into three subgroups, two to be irradiated and one control group. Group 1 was irradiated immediately after infection, beginning with five-minute exposures, 1½ ft. from the lamp, and increasing daily for 5 minutes until 2 hours' irradiation was reached. This maximum exposure was continued until 54 days after infection. Irradiation was begun in group 2, 17 days after infection and was given in the same manner as in group 1, two hours being the maximum dose. Group 3 was the control. Intracutaneous tests were made at intervals from 22 days after infection onward, using 0.1 cc. of a 5 per cent solution of O. T. The animals were killed and autopsied 54 days after infection. (Tables 9 to 12.)

TABLE 8

Autopsies of sensitized animals (double infection—inhaled)

GROUP	GUINEA PIG NUMBER	LYMPH NODES							SPLEEN	LIVER	LUNGS	DAYS AFTER INFECTION
		Superficial inguinal	Deep inguinal	Retro-pertoneal	Tracheo-bronchial	Bronchial	Cervical	Iliacs				
II-1	1	++	++	0	++	0	0	0	0	0	0	72
	2	++	++	+	++	0	0	+	0	0	+	72
	3	0	0	+	+	0	0	0	0	0	0	72
	4	0	0	+	+	0	0	0	0	0	0	72
	5	+	0	0	++	0	0	0	+−	0	0	72
	6	+	0	0	+	0	0	0	+	0	0	72
II-2	1	+++	+++	++	+	0	0	++	0	0	0	72*
	2	++	++	+	+	0	0	+	0	0	0	72
	3	++	++	+	+	0	0	+	0	0	+	72
	4	+++	+++	+++	+++	+	+	+++	++	+	++	72
	5	+	0	0	+	0	0	+	0	0	0	72
	6	+	0	0	+	0	0	0	+	0	0	72
II-3	1	++	++	++	++	+	+	++	++	++	+	72
	2	+	+	+	+	++	+	++	+	+	+	72
	3	+	+	0	+	0	0	+	0	0	0	72
	4	+	+	+	+++	++	+	+	+	0	+	72
	5	+	++	+	++	+	+	++	+	++	+	72
	6	+	+	+	+	+	0	++	+	++	+	72

*Chronic pneumonia.

RESULTS

The autopsy findings showed no material difference between the exposed animals of group 1 and the controls of group 3. However, guinea pigs 1 and 2 of group 2, which received treatment 17 days after infection, had a very small amount of disease, and in guinea pig 3 of group 2 no macroscopic tuberculosis was evident. To attribute this suppression of infection to ultraviolet irradiation, and yet to find the extensive disease in group 1 and in guinea pigs 4 and 5 of group 2, is hardly a permissible explanation. Lack of infection was probably due to some error in technique.

TABLE 9

Skin reactions of group 1 (single infection, subcutaneous)

GUINEA PIG	22 DAYS AFTER INFECTION	28 DAYS AFTER INFECTION	32 DAYS AFTER INFECTION	38 DAYS AFTER INFECTION
1	+	++	+++−	+++
2	++	++	+++−	+++
3	++	++	+++−	+++
4	+	+	+++−	+++
5	+	++	+++	++
6	+	++	++	+++

TABLE 10

Skin reactions of group 2 (single infection, subcutaneous)

GUINEA PIG	22 DAYS AFTER INFECTION	28 DAYS AFTER INFECTION	32 DAYS AFTER INFECTION	38 DAYS AFTER INFECTION
1	+	+	+	+
2	+	+	+	+
3	+−	0	0	+−
4	+	+	++	++
5	+	++	++	++

TABLE 11

Skin reactions of group 3 (controls—single infection, subcutaneous)

GUINEA PIG	22 DAYS AFTER INFECTION	28 DAYS AFTER INFECTION	32 DAYS AFTER INFECTION	38 DAYS AFTER INFECTION
1	+	+−	++	++
2	+−	+	++	+++
3	0			
4	+	+	+	+++
5	+	+	+	+++

TABLE 12

Autopsies of guinea pigs infected subcutaneously

GROUP	GUINEA PIG NUMBER	LYMPH NODES							SPLEEN	LIVER	LUNGS	DAYS AFTER INFECTION
		Superficial inguinal	Deep inguinal	Retro-peritoneal	Iliacs	Tracheo-bronchial	Bronchial	Cervical				
1	1	+++	+++	++	++	++	+	+	++	+	+	54
	2	++	++	+	+	+	0	0	+	+	+	54
	3	+++	+++	+++	++	++	0	0	++	+	0?	54
	4	+++	+++	++	+	+++	0	0	+	++	+?	54
	5	++	++	++	0	++	+	+	++	+++	+	54
	6	++	++	++	0	++	+	+	++	++	+	54
2	1	+	+	+	+	+	0	0	0	0	+	54
	2	0	0	+	0	0	0	0	+	0	0	54
	3	0	0	0	0	0	0	0	0	0	0	46
	4	++	+++	+	+	+++	+	+	++	+	+	54
	5	++	++	+	+	++	+	+	++	++	++	54
3	1	++++	++++	+++	+++	++	+	+	++	+++	++	54
	2	+++	+++	+++	+++	++	+	−−	+	+++	++	54
	3	Died 11 days after infection										
	4	++	++	++	+	++	+	+	++	++	++	54
	5	++	+++	+	+	+++	+	+	+++	++	+++	54

CONCLUSIONS

Under the conditions of inoculation used in the foregoing animals, it cannot be concluded that the experimental tuberculosis of guinea pigs was materially influenced by the irradiations. The intracutaneous reactions correlated rather closely with the autopsies, and both indicated, with few exceptions, steady progression of the disease.

From the findings no conclusive deductions can be made upon the use of light irradiations in patients. Too many varying factors prevent this.

Reprinted from THE AMERICAN REVIEW OF TUBERCULOSIS
Vol. X, No. 2, October, 1924

STUDIES WITH ULTRAVIOLET LIGHT[1]

III. THE BACTERICIDAL ACTION OF MERCURY-QUARTZ-VAPOR LIGHT IRRADIATION

EDGAR MAYER AND MORRIS DWORSKI

All rays of both the visible and invisible spectra possess heat, light and chemical properties, but it is chiefly to the violet and ultraviolet rays that chemical action is attributed. It remained for Downes and Blunt to first demonstrate that these rays were especially bactericidal. Koch and Krattenbacher soon verified this; and since then numerous workers have studied this action upon various microörganisms (Browning, Russ, Jones and VanderLingen). Wiesener alone reported that the infrared wave-lengths were as strongly bactericidal as the ultraviolets, but, on repetition, others could not verify this. It has been shown that with ultraviolet rays the bactericidal effect increases with the diminution of the wave-length and the increased frequency of the vibrations. Changes in the H-ion concentration seem to play no part. Increase in temperature of the surrounding medium of the microörganisms may enhance the bactericidal action. Harris and Hoyt have demonstrated that particularly the amino-acid radicles of the bacteria absorb rays and so cause bacterial death. It is very probable that there is selective action on the part of different wave-lengths for special bacteria. Conflicting reports have been made on the effect of radiation on bacteria, and especially so with the action of sunlight on tubercle bacilli in sputum. The required period of destruction has been reported to vary from a few minutes to 48 hours. The factors that may affect the result are many: altitude, season, humidity and time of day, suspension-state of the bacteria, thickness of the emulsion of sputum, dry or wet state of bacteria, reflecting power of the environment (such as snow or water), temperature, etc. Henri has shown that ultraviolet rays can render tubercle bacilli non-acid-fast.

It has been our aim to study the action of radiation from a quartz-mercury-vapor light upon suspensions of tubercle bacilli and other microörganisms. It was planned also to learn the effect on bacteria suspended in circulating blood. It is realized that hemoglobin has particular absorptive power for ultraviolet and other wave-lengths from this source of light, but it was held that the chemical changes occurring in this absorption might in themselves induce bacterial destruction in the blood-stream. Various sensitizing substances can be employed in combination with longer wave-lengths applied to the blood and possibly induce unknown chemical changes. It is impossible to isolate the various wave-lengths of the quartz-mercury-vapor spectrum without diminishing the intensity of the separate divisions so markedly as to lose bactericidal effect.

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[1] From the Saranac Laboratory, Saranac Lake, New York.

TABLE 1

Exposures of tubercle bacilli to quartz-mercury-vapor radiations (intracutaneous tests)

GUINEA PIG	TIME OF EXPOSURE OF BACILLI TO RADIATIONS	SKIN TEST AFTER 8 DAYS INFECTION	SKIN TEST AFTER 12 DAYS INFECTION	SKIN TEST AFTER 17 DAYS INFECTION	SKIN TEST AFTER 31 DAYS INFECTION
1	3 minutes at 5 inches	0	0	0	0
2		0	0	0	0
3	5 minutes at 5 inches	0	0	0	0
4		0	0	0	0
5	10 minutes at 5 inches	0	0	0	0
6		0	0	0	0
7	15 minutes at 5 inches	0	0	0	0
8		0	0	0	0
9	25 minutes at 5 inches	0	0	0	0
10		0	0	0	0
11	Control: No exposure of bacilli	0	0	Positive	Positive
12		0	0	Positive	Positive
13	Control: No exposure	0	0	Positive	Positive
14		0	0	Positive	Positive

1: A saline emulsion of tubercle bacilli (H37) was made up as follows: Bacilli were thoroughly titrated and then centrifugated at high speed to remove clumps. A loopful of the resulting mixture contained 2 to 8 bacilli to the field when spread over an area of 20 mm. diameter. One-tenth cc. thoroughly spread out with a platinum loop was placed in a series of watch-glasses suspended in cold water to prevent desiccation from the heat of the light. Exposures were made for varying periods, at a five-inch distance, to the rays of an Alpine lamp, whose burner was about 300 hours old. Table 1 shows the periods of exposure and the results of guinea-pig inoculations, together with intracutaneous tests. It is seen that the quartz-mercury-vapor irradiations proved bactericidal in this suspension after a three-minute exposure at a distance of five inches from a 300-hour burner. To attain its maximum intensity, the lamp was burned for fifteen minutes before exposures were made.

TABLE 2

Quartz-mercury-vapor irradiations of suspensions of tubercle bacilli and quinine (intracutaneous tests)

GUINEA PIG	TIME OF EXPOSURE OF BACILLI TO ULTRA-VIOLET RAYS—ULTRAVIOLET AND QUININE	SKIN TEST 8 DAYS AFTER INFECTION	SKIN TEST 12 DAYS AFTER INFECTION	SKIN TEST 17 DAYS AFTER INFECTION	SKIN TEST 31 DAYS AFTER INFECTION
1	2 minutes at 5 inches	0	0	0	Positive
2		0	0	0	Positive
3	5 minutes at 5 inches	0	0	0	Positive
4		0	0	0	Positive
5	10 minutes at 5 inches	0	0	0	Positive
6		0	0	0	Positive
7	15 minutes at 5 inches	0	0	0	Positive
8		0	0	0	Positive
9	25 minutes at 5 inches	0	0	0	0
10		0	0	0	0
11	No exposure (controls)	0	Positive	Positive	Positive
12		0	Positive	Positive	Positive
13	No exposure (controls)	0	Positive	Positive	Positive
14		0	Positive	Positive	Positive

Draughts were avoided in the room and a temperature of about 70°F. was maintained.

The guinea pigs were killed at the end of 40 days. No tuberculosis was evident on gross examination of the organs of animals 1 to 10. The other four (11 to 14) showed tuberculosis well scattered through the lungs, spleen, liver and lymph nodes.

2: Quinine, a fluorescent substance, shows strong absorption for ultraviolet rays, and emits violet light. Often such fluorescent substances can sensitize tissues and cause a changed action of light. The following test was therefore carried out to observe any variation in effect upon tubercle bacilli:

A saturated aqueous solution of quinine was prepared, and 1 cc. was mixed thoroughly with 1 cc. of the solution of the tubercle-bacilli suspension. Exposures were made for various periods, and skin tests were made after guinea-pig inoculations (table 2). Autopsies at the end of 40 days showed tuberculosis in all but guinea pigs 9 and 10.

It required a twenty-five-minute exposure to destroy the tubercle bacilli when mixed with quinine. The absorptive power of quinine for ultraviolet rays may possibly account for this. In experiments carried out by the writers, with direct exposures of quartz-mercury-vapor irradiations to corneal tuberculosis in rabbits, quinine interfered with healing also. No exact explanation can be given.

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